PREDICTING MATH ACHIEVEMENT USING THE SMALSI AS A MEASURE OF MOTIVATION AND LEARNING AND STUDY STRATEGY USE

A Dissertation

by

DAVID ANDREW KAHN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2011

Major Subject: School Psychology

Predicting Math Achievement Using the SMALSI as a Measure of Motivation and

Learning and Study Strategy Use

PREDICTING MATH ACHIEVEMENT USING THE SMALSI AS A MEASURE OF MOTIVATION AND LEARNING AND STUDY STRATEGY USE

A Dissertation

by

DAVID ANDREW KAHN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Co-Chairs of Committee, Anita S. McCormick
Kimberly J. Vannest
Committee Members, Ludy T. Benjamin, Jr.
Cecil R. Reynolds
Bruce Thompson
Head of Department, Victor L. Willson

August 2011

Major Subject: School Psychology

ABSTRACT

Predicting Math Achievement Using the SMALSI as a Measure of Motivation and Learning and Study Strategy Use. (August 2011)

David Andrew Kahn, B.M., The University of Texas at Austin;

M.A., University of Houston-Clear Lake

Co-Chairs of Advisory Committee: Dr. Anita L. McCormick
Dr. Kimberly J. Vannest

The purpose of this study was to evaluate the School Motivation and Learning Strategies Inventory (SMALSI) and the AIMSweb Math Winter Benchmarks to determine if they could be used by school personnel to identify students at-risk of low performance in mathematics. Previous research shows strategy use enhances math achievement and math fluency predicts math achievement. It was thought that if scores on the SMALSI and AIMSweb Math Winter Benchmarks were found to correlate to scores on the math subtests of the Woodcock-Johnson Tests of Achievement (WJ-III) and the TAKS Math Test, then this would provide evidence for using the SMALSI and AIMSweb Benchmarks for identifying students at-risk of learning problems in mathematics. Participants (n = 176) completed the AIMSweb Math Winter Benchmarks, the SMALSI, the math subtests of the WJ-III, and the TAKS Math Test.

None of the scales of the SMALSI were statistically significant predictors of the variance in performance on the WJ-III when used individually. The Writing/Research Skills scale explained the most variance as an individual predictor. When all nine scales were used as predictors, they explained a statistically significant portion of the variance on the WJ-III, with the Reading/Comprehension Strategies scale being the most significant predictor. The level of

learning and study strategy use predicted more of the variance in performance on the WJ-III for students in Fifth Grade than for students in Third and Fourth Grade, even though the level of strategy use remained the same across the three grade levels. In general, females reported using more learning and study strategies and more anxiety during test-taking situations while males reported lower academic motivation and more attention/concentration difficulties. Finally, the AIMSweb Math Winter Benchmarks explained a statistically significant portion of the variance in performance on the WJ-III and the TAKS Math Test. Based on these results, the SMALSI would be a useful screening tool for identifying students who require explicit instruction of learning and study strategies designed to enhance math achievement, and the AIMSweb Math Winter Benchmarks would be a useful screening tool for identifying students at-risk of academic difficulties in mathematics.

DEDICATION

I dedicate this project to all those who have been there from the beginning and helped me navigate my life's journey. To God who has guided me over every mountain and through every valley. To my Lord, Jesus Christ, who has and continues to bless me above and beyond my greatest expectations. To my parents, Robert and Eileen, whose selfless sacrifice allowed me to attend the best public schools and receive the foundation necessary to get me to where I am today, and to my sisters, Deborah and Rebecca, for their support throughout this entire process. Who I am today is a direct reflection of you and the lessons I have learned from you continue to be the touchstones of my life.

ACKNOWLEDGEMENTS

The completion of a task of this magnitude is not accomplished without the help of other people. Many have supported me while completing my degree and while working on this project. I would not have selected this topic had I not taken Clinical Neuropsychology with Dr. Cynthia Riccio. Her lecture on learning disabilities made me see that we have much to learn about math learning disabilities and inspired me to do what I could to fill in the gaps. I also would not have been able to complete this project without the assistance of Dr. Nathan Clemens who helped me access the benchmark assessments and scoring program from the AIMSweb on-line system.

I would like to acknowledge my committee. Dr. Kimberly Vannest is a gifted scholar, and I have learned so much from her about how to conduct meaningful and high quality research. Dr. Anita McCormick is a wonderful person and a phenomenal supervisor and graduate advisor. Without her support and her help in securing the supervised experience necessary for pursuing licensure as a psychologist, I would not have finished my doctoral studies at Texas A&M University. I want to thank Dr. Cecil Reynolds for introducing me to the SMALSI and helping me see how it could be used in a study investigating mathematics. I was fortunate to have Dr. Thompson for the majority of my statistics courses. He helped me develop a conceptual approach to understanding statistics. Without his guidance, I would not have been able to run the statistical analysis needed for this study or have been able to derive anything meaningful from it. Finally, I want to thank Dr. Ludy Benjamin for being an exemplary teacher. I am a better writer because I took his History and Systems in Psychology class, and his class helped me see how significant events in the past have shaped current trends in psychology and education.

I would like to thank the Galena Park Independent School District, especially Carol Booth and Darrell McWhorter, for their interest in this study, and Terri Moore, the principal at Williamson Elementary School, who agreed to allow students on her campus to participate in this study. I want to thank the teachers and staff at Williamson Elementary School who assisted me with all of the logistics of conducting this study. Next, I want to thank all of the students and parents at Williamson Elementary School for their willingness to participate. Their contribution was essential in making this study possible. A special thank you goes to Nancy Webster who provided the scores on the AIMSweb Math Winter Benchmarks and the TAKS Math Test and to Janet McKenzie who provided the demographic information for the participants in this study. Finally, I want to thank the National Council of Teachers of Mathematics and the Association of Former Students at Texas A&M University. Their financial contributions helped tremendously and made this study possible.

I would also like to acknowledge the undergraduate and graduate students who worked on this project. Special thanks to Chelsea Vaughan who helped me edit, merge, and format the data files, making them ready to run through SPSS. I want to thank Sasi Alumtamboon, Joy Barton, Nicole Bell, Dillon Bloodworth, Maegan Bruno, KeriAnn Brzozowski, Amanda Chow, Karen Diepstra, Mark Guerrero, Jordan Hamilton, Keirsten Hamilton, Thomas Harwell, Ashlynn Joseph, Scarlett Kioutas, Ian McKnight, Christopher Perez, Ethan Saporito, Donika Shpati, Joel Varner, and Kayla West for making those day trips to Houston to assist with data collection and for the hours spent assisting with data entry. Without their hard work and support, I would not have been able to complete this study. I thank all of them from the bottom of my heart.

I had many reasons for returning to graduate school and pursuing a doctorate in school psychology. The fundamental reason was to become a psychologist trained as a scientistpractitioner. I would not have been able to achieve this goal without my practicum experience in the Blue Bird Circle Clinic of Pediatric Neurology at Texas Children's Hospital with Drs. Lynn Chapieski and Karen Evankovich. Their direct supervision and structured didactic experiences helped make this goal a reality for me. My training was solidified by my internship experience in the Nebraska Internship Consortium in Professional Psychology, operated by the school psychology program at the University of Nebraska-Lincoln. The internship co-directors, Drs. Sue Swearer and Keith Allen, and my internship supervisor, Dr. Lynn Bogart, allowed me to individualize my internship program and develop the clinical skills necessary for being an ethical and competent Psychologist.

Last but not least, I would like to thank Dr. Nancy Watson, an exceptional human being and mentor. Dr. Watson was my boss for three years, and she provided a space where I came to feel safe and knew that I would be accepted completely for who I am. I never once felt discriminated against because of my status as a non-traditional student when working with her, and her words of encouragement pulled me through some of the toughest times I faced while a student at Texas A&M University. For her guidance and great advice, I will always be indebted.

TABLE OF CONTENTS

LIST OF TABLES

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

CHAPTER I

INTRODUCTION

John is a twelve-year-old male in the sixth grade referred for an evaluation because he is failing math class. When asked the question, "If a foot-long ruler were divided into six equal parts, how long would each part be?" John responded, "One sixth." When he was asked the question, "If three people each have $4, how much money do they have all together?" he responded, "Between $10 and $14." When the examiner decided to perform testing of limits and gave John the opportunity to explain how he solved each of these problems, it became clear that he knew that a foot had twelve inches and that one-sixth of a foot is two inches, but when working independently, he was unable to come up with an approach that led to the correct solution. For the second problem, he did not understand that the problem required an approach that led to a single solution.

Katherine is a fourteen-year-old female in the eighth grade. She has struggled in math since the fourth grade, but she has always been able to maintain a passing average in math. For the first time, she is failing math and her math teacher is concerned about her performance. Her math teacher reports that Katherine does not look for patterns or meaning when she does math problems. She often looks puzzled when other students seem to solve problems easily. Her teacher has noticed that Katherine tries to memorize everything, as if remembering the response to word problems is the only way she can get the right answer. Many times the answer that she writes is not even close to the correct solution. Her teacher is trying to find ways to ensure that Katherine understands the problem, is able to determine the procedure for how to solve the problem, and is not just trying to imitate the other students in her class.

This dissertation follows the style of *School Psychology Quarterly*.

Both John and Katherine share many characteristics of students who experience difficulties and are at-risk of academic failure in math. Poor planning processes, slow execution rates, and deficient reading skills are common problems for students with math difficulties. Students who lack awareness of the skills, strategies, and resources that are needed to perform a task and who fail to use self-regulatory mechanisms to perform a task will also have difficulty with mathematics (Montague & van Garderen, 2008; Swanson & Jerman, 2006; Swanson & Saez, 2003; Wong, Harris, Graham, & Butler, 2003).

In response to students like John and Katherine, researchers and educators have developed models that attempt to explain academic difficulties in math in order to create effective prevention and intervention programs (Case, Harris, & Graham, 1992; Fuchs et al., 2006). One model that has shown a lot of promise is based on the premise that difficulties in math are due to a failure to develop or use self-regulatory strategies (Fletcher, Lyon, Fuchs, & Barnes, 2007). Self-regulatory strategies allow an individual to set academic goals, apply the appropriate strategy to problem solving situations, use the appropriate resources for completing academic tasks, monitor one's own learning and mastery of material, make appropriate attributions when explaining failure, and handle mistakes in a productive manner (Boekaerts & Corno, 2005; Boekaerts & Niemivirta, 2000; Zimmerman & Martinez-Pons, 1986). Self-regulatory strategies have been found to improve performance in mathematics because they are critical for generalization and transfer of learning (Montague, Applegate, & Marquard, 1993). Interventions addressing the development of self-regulatory strategies have been implemented class-wide in general education settings (Fuchs et al., 2003; Perels, Dignath, & Schmitz, 2009). In addition, researchers have examined the effects of tutoring programs providing explicit instruction of self-regulatory strategies to students with learning disabilities (Fuchs, Fuchs, Hamlett, & Appleton, 2002; Fuchs, Fuchs, & Prentice, 2004). Results have supported the effectiveness of these treatments, especially when they are combined with explicit instruction of rules for problem solutions.

The development of programs to address deficits in self-regulatory strategies is important, especially with the current emphasis on the use of instructional methods and assessment procedures known as Response to Intervention (RTI). RTI involves providing a specific intervention and measuring the student's response to the intervention. (Brown-Chidsey & Steege, 2005). RTI is a systematic and data-based method for identifying, defining, and resolving academic and behavior difficulties where, unlike in past models, assessment and instructional practices are integrated into an objective data-based system with built-in decision stages (Fletcher, Coulter, Reschly, & Vaughn, 2004).

Equally important is the development and use of assessment tools for monitoring student progress and for screening and identifying students who require more intense intervention. One of the basic tenets of RTI is universal screening and monitoring of all students and the use of assessment data in selecting students for intense intervention (Fletcher et al., 2002). Most researchers examining interventions that target self-regulatory strategies have created their own questionnaires to measure progress because few measures of self-regulation are currently available. The School Motivation and Learning Strategies Inventory (SMALSI) is a self-report inventory that measures a number of constructs related to self-regulation, including study-strategies, listening skills, reading comprehension strategies, test taking strategies, organizational skills, and time management (Stroud & Reynolds, 2006). It was designed for use in both the pre-referral and referral process and in the development of intervention techniques.

The primary purpose of this study was to evaluate the SMALSI and to determine its potential utility in being used for universal screening and progress monitoring in an RTI model for addressing academic difficulties in mathematics. Conducting such a study was important because the SMALSI is one of the few instruments available for measuring strategies that facilitate self regulation. There was also little prior research that had been conducted on the use of the SMALSI and instruments like it in the pre-referral process. Undertaking this study provided an opportunity for exploratory and descriptive research on the relationship between scores on the nine constructs measured on the SMALSI with scores on a norm-referenced measure of math achievement.

A second purpose of this study was to evaluate a system of short math probes designed to assist school personnel with identifying students experiencing academic difficulties and monitoring the progress of students receiving intervention services. Previous research has examined the relationship between probes measuring math fluency and performance on statewide assessment measures of mathematics, but little research has been done on the relationship between probes measuring math problem solving and performance on statewide assessment measures of mathematics. In addition, there has not been any research examining the relationship between performance on math probes measuring math fluency and math problem solving and performance on norm-referenced measures of math achievement.

A third and final purpose of this study was to investigate performance on the SMALSI to determine if there were systematic differences in performance based on grade level and gender. Analysis included in the test manual for the SMALSI using the standardization sample did not find any systematic differences, but there is research to suggest that students develop and use more learning and study strategies as they move up from one grade level to the next. In addition, there is research that suggests that male students and female students differ in their use of learning and study strategies, with female students tending to use more strategies than male students.

CHAPTER II

REVIEW OF THE LITERATURE

This review is divided into seven sections. The first provides a summary of mathematics education in the United States, providing the background information necessary to understand current trends occurring in mathematics instruction. The second section summarizes the extensive literature on learning disabilities in general and learning disabilities in mathematics. The third section reviews the literature on metacognitive and self-regulatory skills that have been associated with successful performance in mathematics. The fourth section discusses research on learning and study strategies, a special subset of metacognitive and self-regulatory skills that are specific to performance in academic settings. The fifth section is about response to intervention and curriculum based measurement, two topics that are related to the prevention and identification of math learning disabilities. The sixth section describes several evidence-based interventions that are intended to address metacognitive and self-regulatory skill deficits in children experiencing difficulties in mathematics. The final section presents areas needing future research and the statement of the problem.

Mathematics Education in the United States: A Brief History

The traditional focus of curricula in American schools is instruction in reading, written language, and mathematics. Mathematics is the science and study of quantity, measurement structure, space, time, and change (Gullberg, 1997). Curriculum and instruction in the area of mathematics has gone through several transformations throughout the history of American public schools. The areas emphasized in the study of math have changed over time to meet the demands of American society. During the nineteenth century, math instruction focused on students learning basic arithmetic and geometry because these skills were necessary for people to perform the expected functions and everyday business transactions of the time. Math instruction continued to focus on basic arithmetic during the early twentieth century but with an increased emphasis on rote practice and memorization of basic math facts and computation (Ewing, 1996; P. Jones & Coxford, 1970; National Council of Teachers of Mathematics, 1970). This emphasis came as a result of the influence of behaviorism on math instruction. In particular, Thorndike's connectionist theory and Skinner's theory of operant conditioning led to a kind of drill and practice that put students in the position of telling *what* rather than focusing on the *why* (Burrill, 2001; Rappaport, 1966).

In the 1940s and 1950s, the development of atomic weapons and the Soviet launch of Sputnik resulted in an increase in federal funding available for programs designed to prepare teacher educators, particularly in the areas of math and science. The goal was to ensure that the United State could compete internationally and maintain its status as a superpower (Kilpatrick, 1992). The new math curricula of the 1950s and 1960s emphasized instruction in abstract mathematical concepts starting in the elementary grades. The purpose of these curricula was for students to gain a formal understanding of mathematical principles and concepts from the early grades onward. The abilities to understand the structure of mathematics, prove or explain final answers or products, generalize procedures from one problem solving situation to another, and perform abstractions were at the core of this reform (P. Jones & Coxford, 1970; Stanic & Kilpatrick, 2003). The goal of mathematics education was to understand and develop a precise mathematics vocabulary.

Teaching methods were developed with the intent of enhancing transfer of learning across different problem solving situations, a weakness of prior methods in math instruction that many educators recognized as based on the principles of behaviorism (Lagemann, 2000). Math instruction of the 1960s was influenced by constructivist theories, which stressed the value of discovery learning. Gestalt psychology and gestalt principles provided a framework for structuring instruction around part-whole relationships and the continual reorganization of knowledge. Insight was considered important and activities were incorporated into instruction that allowed students to analyze situations, identify patterns, and discover fundamental mathematical principles and relationships on their own (Klein, 2003; Rappaport, 1966). The ideal environment for learning math, particularly at the elementary level, was seen as one in which students were given manipulatives, teachers carefully guided student learning, and students who were struggling were provided appropriate levels of prompting and support (Klein, 2003; Riedesel, 1967).

The new math of the 1960s was unsuccessful for three primary reasons. First, the abstract nature of mathematics at the elementary level made it controversial among public educators. Second, there was little or no professional development offered to teachers at the time of its adoption, and this new approach to teaching math required teachers to reconceptualize their own understanding of mathematics for it to be successfully implemented. Third, the new math was not conducive to the instructional needs of students who were slow learners in math (Moon, 1986). In response to the new math of the 1950s and 1960s, the back-to-basics movement of the 1970s saw math curricula evaluated using a process-product approach. Instruction at the elementary level focused on basic math skills and standardized tests became the primary dependent measure for student learning. Standardized tests also became the preferred method by which states and districts evaluated the quality of their schools (Gelman & Gallistel, 1978; Ginsburg, 1977; Kilpatrick, 1992).

In the 1980s, computers became prominent and many math education researchers began to view the computer as a model for human thought processes. Educational research in mathematics began to focus on problem solving and the cognitive processes used when analyzing and solving word problems. Of particular interest were the importance of knowledge organization and conceptual understanding of mathematics (Silver, 1987). The way information became organized in long-term memory, the role that visual images played in enhancing understanding, and the effect of metacognition on the problem solving process were also investigated (Skemp, 1987). Visual imagery seemed to serve as a form of representational memory and an aide to mathematical understanding (Janvier, 1987).

In 1989, the National Council of Teachers of Mathematics created a new set of standards. These standards launched a period of reform in the content-areas in math. The 1990s were a time when high achievement in mathematics was emphasized as it became clear that America was transforming from a postindustrial to an information economy (United States Department of Labor, 1991; Commission on the Skills of the American Workforce, 1990). Educational reform in the 1990s focused on the need to produce individuals who possessed high levels of math literacy and were proficient in the uses of technology and communication (United States Department of Labor, 1991; National Council of Teachers of Mathematics, 1989). Standardized assessments were criticized because they tended to measure basic skills over complex understanding (Linn, Baker, & Dunbar, 1991). Mathematics research and education began to focus on curricular and pedagogical practices and the conceptual aspects of math instruction (Schmidt et al., 1996). From a pedagogical perspective, effective math teachers were seen as those who knew mathematics and understood how to communicate concepts (Schmidt, McKnight, & Raizen, 1997). Conceptual analyses of mathematical topics were conducted at the elementary (Leinhardt, Putnam, & Hattrup, 1992), middle school (Carpenter, Fennema, Franke, Levi, & Empson, 1993), and high school levels (Chazan, 2000).

Mathematics research began to combine elements of cognitive psychology and information processing with elements of the constructivist perspective. The influence of contextual factors, such as group dynamics, culture, and the role of language started to be investigated. Researchers looking at language were critical of the type of learning that promoted a "tool kit" view of knowledge. In the traditional math curriculum, students were taught to solve word problems looking for "clue words" to determine the operation needed to solve the problem (Lave, 1988). This type of approach did not transfer to many of the real-world math problems encountered by adults, nor did it facilitate learning the higher level problem solving skills necessary for advanced courses in mathematics. Transfer of mathematical concepts across situations was found to be more complicated than previously thought, and the cultural context was found to be a major factor in promoting transfer and in shaping understanding of math concepts (Anderson, Reder, & Simon, 1996). Learning math concepts through group work, discussion, and writing about strategy use were all contextual variables that were found to promote thinking mathematically among students (Hiebert et al., 1996). By the end of the decade, a number of reform-based curricula were created and adopted by school districts throughout the United States and many studies showed promise for these methods (Cohen & Hill, 2001; Fuson, Carroll, & Drueck, 2000; McCaffrey et al., 2001; Schoenfeld, 2002).

At the start of the new millennium, the process of mathematics instruction in U.S. classrooms has become more complicated. The National Council of Teachers of Mathematics released new standards in 2000, and these standards moved every state in the nation to adopt new content or curriculum standards in mathematics (National Council of Teachers of Mathematics, 2000, 2006). The new reform-based instructional approaches developed in the 1990s are being used alongside the traditional approaches developed in previous decades (Woodward, 2004). There continue to be critics who cast doubt on the systematic efforts to reform mathematics and advocate for a basic skills approach to mathematics instruction (Thompson, 2009). Reform-based instructional approaches are particularly challenging for students who are slow learners or who have a learning disability in mathematics (Rivera, 1997) and many teacher education programs continue to emphasize a basic skills approach (Thompson, 2009). As math instruction has started to focus less on math calculation and more on math reasoning and problem solving, more students are identified as experiencing difficulties in the area of mathematics. There continues to be a need for research focusing on the cognitive and metacognitive aspects of these areas so that teachers can intervene and students can progress through the general curriculum.

One subject of recent research on math instruction is the long-term effects of traditional approaches to teaching mathematics, such as Worked-out Examples, and new instructional methods that incorporate metacognitive training (Mevarech & Kramarski, 2003). Worked-out Examples is a common approach to teaching math problem solving processes. In this approach, the teacher specifies all of the steps needed to solve the problem. The sequence of actions required for solving the problem is explained. The solutions of many problems of the same type are reviewed so that students can consolidate knowledge of the process and the kind of expected solutions. An alternative to this approach, instructional methods that incorporate metacognitive training, aims to develop in students the necessary metacognitive processes for successfully solving the problem (Kramarski & Hirsch, 2003; Kramarski & Ritkof, 2002; Teong, 2003). Results of two studies using a sample of fourth graders, one focusing on children identified as having a learning disability in mathematics and one with children experiencing learning difficulties in math, showed that children in both studies responded positively to instruction with metacognitive training, with both sets of children demonstrating an increase in math achievement scores and better performance on math problem solving tasks compared to students who received the traditional Worked-Out Examples approach (Lucangeli & Cabrele, 2006).

Slow Learners and Learning Disabilities in Mathematics

Early Research on Learning Disabilities

The first work that showed any clear relevance to today's conceptualization of learning disabilities was conducted by Gall on patients who exhibited disorders of spoken language in the early 19th century (Wiederholt, 1974). He performed clinical studies in the field of brain injury that first established the observation of children and adults who manifested "specific" deficits rather than pervasive or "generalized" deficits. Based on his observations, Gall argued that it was essential for clinicians to rule out other conditions that would better explain the deficits, such as mental retardation or a visual or hearing impairment (Hamill, 1993). The first case study of an individual with impaired math ability occurred as the result of a lesion to the brain's left hemisphere with no disruption to language functioning (Lewandowsky & Stadelmann, 1908). Other cases of individuals experiencing difficulty with mathematical operations and reasoning were also documented during the early part of the twentieth century (Henschen, 1919; Peritz, 1918). The term acalculia was coined to describe an acquired disability of mathematics calculations (Henschen, 1919) and fifty years later the term dyscalculia was used to describe a developmental mathematics disorder, defined as "a structural disorder of mathematical abilities that has its origin in a genetic or congenital disorder of those parts of the brain that are the direct physiological substrate of the maturation of the mathematical abilities adequate to age, without a simultaneous disorder of general mental functions" (Kosc, 1970, p. 192).

Learning Disabilities Defined

The concept of learning disabilities was still new in the 1960s. It was first defined as a "disorder in the development of language, speech, reading, and associated communication skills needed for social interaction" that was not due to mental retardation or a sensory impairment (Kirk, 1963, pp. 2-3). The federal definition uses the term specific learning disability and defines it as "a disorder in one or more of the basic psychological processes involved in the understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning disabilities, which are primarily the result of visual, hearing, or motor handicaps, or mental retardation, or emotional disturbance, or of environmental, cultural, or economic disadvantage" (Individuals with Disabilities Education Improvement Act, 2004, p. 118). This definition has existed as the federal statutory definition of LDs since 1968, despite frequent criticism that it does not specify any inclusionary criteria for LDs. Instead, it describes LDs as being heterogeneous and focuses on what the disability is not (Fletcher, et al., 2007). The federal regulations identify two areas related to mathematics, mathematics calculation and mathematics problem solving. Mathematics calculation is used to refer to a deficit in the comprehension or performance of basic arithmetical operations (addition, subtraction, multiplication, and division) using integers, fractions, and variables. Mathematics problem solving refers to a deficit in the comprehension of situations that require the use of mathematical concepts and principles, deductive reasoning, and the application of arithmetical operations in order to derive a solution to a contrived or real-world problem or situation (Geary, 2004). The National Joint Committee on Learning Disabilities

(1988) definition of learning disabilities refers to significant difficulties in "mathematics abilities." The DSM-IV (American Psychiatric Association, 2000) uses the term "mathematics disorder." The International Classification of Diseases-10 (World Health Organization, 1992) provides criteria for the identification of "specific disorder of arithmetical skills."

Despite the different descriptors and criteria, all of these definitions are based on the assumption that the individual has average or above-average intellectual ability, normal sensory function, adequate educational opportunity, and the absence of a developmental or emotional disorder. All of the diagnostic systems assume that a person can have difficulties in either basic math calculation or math problem solving. This is contrary to the work of early researchers, who identified six categories of difficulties in math, including difficulties verbally designating mathematical terms and relations, manipulating real objects in accordance with the conventions of mathematics, reading mathematical symbols, manipulating mathematical symbols in writing, carrying out mathematical operations, and understanding mathematical ideas and in performing mental calculations (Kosc, 1970). Recent research by experts in math LDs have provided further verification for these six areas (Geary, 1993; Mazzocco & Myers, 2003).

Criteria for Identifying Math LDs in Research and Practice

The persistent vagueness of the definitions of LD has led to no consistent standards by which to judge the presence or absence of LDs in mathematics, and many broad terms, such as "LDs in mathematics," "developmental arithmetic disorder," "mathematics disabilities," and "specific mathematics disabilities" have been used in research to describe a variety of impairments in mathematics skills ranging from computation to problem solving to word problems. The term "mathematics learning disability" has been used synonymously with the term "dyscalculia" to describe a condition in which specific, as opposed to generalized, deficits in either calculation or mathematical thinking. It usually implies that oral language, reading, and writing are intact (Fleishner, 1994; Strang & Rourke, 1985). While experts agree that a common operational definition of learning disabilities would be useful and meaningful (Kavale & Forness, 2000; Swanson, 2000), most studies provide a vague description of the children who fit into their category of 'children with learning disabilities.' Several authors also use a group of students identified as 'low performing students in mathematics.' The criterion suggested for identifying mathematical learning disabilities in children is a score lower than the 20th or the 25th percentile on a mathematics achievement test combined with low average or average IQ (Geary, 2004).

Three further criteria have been used by professional evaluators for identifying individuals with mathematics learning disabilities. The 'discrepancy criterion' involves identifying students who perform significantly poorer in mathematics than would be expected based on their general school performance or intellectual ability (Hallahan & Mock, 2003). This is the criteria most commonly used in determining eligibility for special education services. The 'severity criterion' is consistent with the DSM-IV, identifying only those individuals whose difficulties in mathematics as measured on a validated test is two or more standard deviations below the norm (American Psychiatric Association, 2000). The 'resistance criterion' is based on data collected by the child's classroom teacher that documents difficulties in math that remain severe, despite receiving adequate math instruction and usual remediation services during a specified period of time during the academic year (Fuchs & Fuchs, 1998; Gresham, 2002b). It is recommended that this period of time be approximately six months, providing enough time for the administration of multiple assessments and specific attempts to intervene with the student (Fletcher, Morris, & Lyon, 2003).

Models for Explaining Math LDs

Two predominant hypotheses have been developed to explain the presence of learning disabilities in children. The first hypothesis, the delay or maturational lag hypothesis, proposes that children with a learning disability in mathematics are exhibiting a delay in the development of mathematics proficiency (Geary, 1990). This hypothesis is based on research examining the typical development of mathematics and cognition. Support for this hypothesis has been found in research that has shown that students with a math learning disability tend to make similar errors when recalling basic math facts as students in lower grades (Geary, 1993). In addition, students with math LD tend to use more immature computational and problem solving strategies (Geary & Hoard, 2001). It is believed that many students exhibit these delays because of either inadequate instruction in math or entry into school with limited knowledge of numbers so that they were unable to benefit from instruction (Geary, 2004). The delay-hypothesis appears to be especially true for students exhibiting weaknesses in procedural knowledge of basic mathematical concepts (Geary, 2003).

The second hypothesis is a deficit hypothesis proposing that mathematical learning disabilities are really the result of inadequate or poorly developed cognitive or metacognitive skills and knowledge (Desoete, 2006). This is based on research that has shown that children identified as low achievers in mathematics demonstrate commensurate weaknesses in the areas of fluid reasoning and crystallized knowledge when evaluated using the Cattell-Horn-Carroll model of cognitive abilities (Proctor, Floyd, & Shaver, 2005). In the area of basic math skills, the broad areas of long-term retrieval and short-term memory were found to be predictive of performance throughout childhood and adolescence (Floyd, Evans, & McGrew, 2003; McGrew & Wendling, 2010). In the area of math reasoning, crystallized knowledge, fluid reasoning, processing speed, and short-term memory have all been found significant predictors of performance (Hale, Fiorello, Kavanagh, Hoeppner, & Gaither, 2001; Keith, 1999; McGrew, Flanagan, Keith, & Vanderwood, 1997; McGrew & Wendling, 2010).

Metacognitive skills, in particular the ability to plan, predict, monitor, evaluate, reflect, and regulate one's behavior, are predictors of success or failure on mathematical problem solving tasks (Vermeer, 1997; Vermeer, Boekaerts, & Seegers, 2000; Wong, 1996; Wong, et al., 2003). Metacognitive knowledge and skill parameters were found to predict a student's performance on individual math problem solving tasks and how accurate the student would evaluate their performance in the absence of feedback (Desoete, Roeyers, & Buysse, 2001). Student performance and evaluation differentiated children with mathematical learning disabilities from below-average performing peers (Desoete & Roeyers, 2002). In addition, it also differentiated below-average performing and average performing peers from expert problem solvers (Desoete, Roeyers, & De Clercq, 2004). Results for an assessment of metacognitive skills (De Clercq, Desoete, & Roeyers, 2000) was found to differentiate between good, moderate, and poor performers on paper and pencil (Desoete, Roeyers, Buysse, & De Clercq, 2002) and computerized (Desoete & Veenman, 2006) measures of math achievement. Interestingly, the majority of students with learning disabilities consider themselves appropriately strategic in their use of metacognitive skills, while teachers consistently report that students with learning disabilities use few, if any metacognitive or learning strategies. Of those used, teachers report that students with learning disabilities use them less frequently and less efficiently than their non-disabled peers (Meltzer, Roditi, Houser, & Perlman, 1998).

Academic and Non-Academic Deficits Associated with Math LDs

The identification of math learning disabilities can be difficult because deficits in math are frequently associated with other LDs, especially reading (Fleishner, 1994; Fuchs, et al., 2004; Rourke & Finlayson, 1978). Students with math learning disabilities perform notably poorer on measures of vocabulary, despite having average reading skills (Fletcher, 2005). It is still unclear whether there is a separate academic skill deficit involving math reasoning that cannot be explained by difficulties with reading and language (Fletcher, et al., 2007). A current problem in defining math LDs is the need to focus on identification of a set of key academic and non-academic skill deficits that can serve as markers for one or more LDs in math. This would include the identification of critical components of math proficiency, much like the work that has been done in reading, which has broken reading down into critical components, such as word recognition, fluency, and comprehension (Fletcher, et al., 2007).

Conceptual and procedural aspects of mathematical knowledge (understanding the concept of cardinality versus knowing how to count from one to ten) appear to be required for the performance of many mathematical tasks, and mathematical skills develop based on the reciprocal relationship that appears to exist between conceptual and procedural knowledge. This has caused some to question attempts to separate knowledge of mathematical concepts from mathematical calculations and mathematical reasoning in definitions of mathematical disabilities (Rittle-Johnson, Siegler, & Alibali, 2001). A model based on studies of acquired acalculia has characterized the basic components of math as being separate systems for number-processing and calculation systems. For this reason, basic numerical competency, much like word recognition in reading, appears to be a specific marker for mathematics learning disability in the early elementary grades. Fluency when calculating the basic mathematical operations appears to be a specific marker for students in late elementary grades and beyond (McCloskey & Caramazza, 1985). Understanding of conceptual and procedural knowledge in mathematics (base-10 arithmetic versus rules and strategies for borrowing and carrying) are supported by different cognitive systems, suggesting that conceptual and procedural knowledge of mathematics are two additional basic components of math (Geary, 2004).

Developmental and evolutionary psychologists have studied a phenomenon called "number sense," which is defined as a basic inherent need to understand magnitude and quantities and to be able to count and compare numbers (Butterworth, 2005; Dehaene & Cohen, 1997). In studies with humans, infants and preschoolers are able to discriminate differences in numerosity, the awareness of numbers and quantities, and understand transformations of quantities, such as adding and subtracting, when exposed to small set of numbers (Butterworth, 2005; Ginsburg, Klein, & Starkey, 1998; Starkey, Spelke, & Gelman, 1991; Wynn, 1992, 2002). Evidence of number sense has been interpreted to support the notion that these early numerical abilities are not influenced by language and that mathematics is primarily nonverbal in nature (Butterworth, 2005). Children develop number knowledge independent of instruction, and the primary effect of math instruction on number sense is exposure to strategies that allow children to manipulate numbers more efficiently (Biddlecomb & Carr, 2011). Difficulties in this early math ability are strongly associated with math learning disabilities (Hodent, Bryant, & Houde, 2005), and scores on measures of numerosity and number sense have been positively correlated with math achievement scores (Bugden & Ansari, 2011).

Research in early math development has expanded the concept of number sense to include several basic skills that are critical predictors of future performance on measures of math achievement. These skills include counting aloud up to one hundred, counting up to ten objects, estimating quantities between one and nine, performing nonverbal calculations involving addition of number combinations with sums between one and nine, identifying written numbers between one and twenty, and discriminating between two quantities that are between one and ten (Howell & Kemp, 2010; Lago & DiPerna, 2010). In particular, counting skills in Kindergarten were found highly predictive of mathematical performance in first grade (Aunio & Niemivirta, 2010). Performance on number sense tasks has also been found to be associated with performance on rapid naming of objects, colors, and numbers (Lago & DiPerna, 2010). Unfortunately, parents and other caregivers are not always responsive when math deficits are apparent in preschool aged children (VanDerHyden, 2010). “Number talk,” which is dialogue involving quantities and mathematical concepts that occurs between children and their parents or dialogue overheard by children that occurs between two parents or caregivers, has been found to positively impact number sense and math achievement (Levine, Suriyakham, Rowe, Huttenlocher, & Gunderson, 2010).

While math calculation skills appear to rely on nonverbal abilities, it is still unclear the degree to which math reasoning requires reading or language. More than likely, most people require the use of some degree of both verbal and nonverbal processing while completing math tasks. When examining mathematical precursors in young children enrolled in Kindergarten, a child’s performance on symbolic tasks, such as the ability to recognize and compare quantities represented in pictorial form, had a more direct relationship with performance on a measure of addition facts, and performance on non-symbolic tasks, such as counting objects, had an indirect relationship (Cirino, 2011). When word problems are read aloud to students, the verbal processing component appears to be removed, providing further evidence that math calculation and math reasoning require minimal use of language (Geary, 2004). For advanced math and development in areas of math like geometry, language may provide a set of symbols, such as shared terminology or counting words, that have no inherent meaning but provide a medium for mapping between distinct representational systems, the quantitative and language systems, creating representations that are more integrated and more powerful, resulting in new and more efficient mental structures (Spelke & Tsivkin, 2001).

Still, an adequate explanation of all mathematical competencies, especially those related to problem solving, would not seem complete without investigating the impact of the language system, regardless of whether language simply facilitates the development of mathematical skills or has a causal relationship with the development of core mathematical skills and concepts (Carey, 2004; Gelman & Butterworth, 2005). Successful word problem solving requires students to understand language and factual knowledge and comprehend the relations and goals of the problem (Desoete, Roeyers, & DeClercq, 2003). Recent neurophysiological studies have shown that the language areas of the brain are activated during mental arithmetic involving large numbers as well as when students are asked to solve word problems, suggesting that verbal strategies are used when performing everyday math activities (Grabner & DeSmedt, in press). Despite their inherent reliance on language, word problems play a critical role in helping children connect and apply different meanings, interpretations, and relationships to mathematical situations and operations (Van de Walle, 2007).

Traditional and Current Conceptualizations of Math LDs

Whether performance on quantitative tasks is the result of innate numerical representations, nonnumeric perceptual cues, language or general attention mechanisms continues to be the source of much debate (L. D. Cohen & Marks, 2002; Hodent, et al., 2005; Mix, Huttenlocher, & Levine, 2002; Wynn, 2002). A traditional view of math learning disabilities is apparent in the early work on LDs in math that explains mathematical skills as being the result of different domains of knowledge that are built on cognitive or neuropsychological systems (Geary, 2004; Rourke, 1993). These systems include the language system, the visual-spatial system, working memory, and the central executive system that is responsible for sustained attention and inhibition of irrelevant information (Geary, 2004). A new view has been developed that attempts to study these complex processes, identify the specific mathematical skills associated with each process, the possible cognitive deficits that could lead to difficulties in math, and possible ways of intervening to address these difficulties. Working memory, cognitive flexibility, and inhibition have all been linked to math achievement (Agostino, Johnson, & Pascual-Leone, 2010). Children with LDs in math vary in the math skill deficits they present and in the cognitive processing deficits related to these skills (Fuchs et al., 2005; Fuchs, et al., 2006; Hanich, Jordan, Kaplan, & Dick, 2001).

Working memory is particularly important during the primary grades, and this is likely because children at these grade levels cannot rely on long term memory for recalling math facts (Monette, Bigras, & Guay, 2011). Mathematics involves computation, which requires knowledge and retrieval of facts and the application of procedural knowledge. When investigating the association between cognitive abilities and math achievement, word retrieval and executive-procedural knowledge were strongly predictive of math calculation skills but not visuospatial skills (Cirino, Morris, & Morris, 2002). When math reasoning was examined, word retrieval and visuospatial skills were highly predictive, which may be due to the way that tasks involving math reasoning are presented, usually in the form of a word problem or a chart or diagram (Cirino, Morris, & Morris, 2007). Problem solving and mathematical reasoning, particularly solving word problems, involves a number of academic and cognitive skills, including computation, language, reasoning, reading skills, and visual spatial skills (Geary, 1993). Both of these competences requires that the individual be attentive, organized, able to switch between two different tasks or operations, and work quickly enough so that working memory storage is able to retain the information without becoming overloaded (Fletcher, et al., 2007).

The impact of working memory is complex, with numerical computation being related to short-term verbal memory, or verbal working memory when regrouping is required, and numerical estimation being related to visual-spatial working memory (Khemani & Barnes, 2005). Across studies, it becomes clear that children with math difficulties perform worse on measures of working memory than children without math difficulties (Raghubar, Barnes, & Hecht, 2010). In addition to deficits in working memory, deficits in processing speed have also been associated with deficits in the areas of arithmetic procedural skills, number fact retrieval, place value concept, and number sense (Chan & Ho, 2010).

Prevalence Rates of Math LDs

In the United States, between five and ten percent of children will be diagnosed with some form of learning disability in mathematics by the time they complete high school (Badian, 1983; Barbaresi, Katusic, Colligan, Weaver, & Jacobsen, 2005; Mazzocco & Myers, 2003). Similar prevalence rates have been found in other countries (Desoete, et al., 2004; Gross-Tsur, Manor, & Shalev, 1996; Ostad, 1998; Shalev, Manor, Auerbach, & Gross-Tsur, 1998; Shalev, Manor, & Gross-Tsur, 2005; Stock, Desoete, & Roeyers, 2006). Starting in the 1980s, there was a rapid increase in the number of students identified as having learning disabilities (McBride, Dumont, & Willis, 2004). The number of students classified as having learning disabilities has continued to increase substantially over the last twenty years (Swanson, 2000; Swanson & Jerman, 2006).

The early identification of children at risk of math difficulties and the delivery of early intervention is critical for several reasons. Once children are behind in mathematics, they tend to stay behind (Shalev, et al., 2005). Early mathematical skills are an important predictor of later educational achievement in mathematics and reading (Duncan et al., 2007). Kindergarten math skills are stronger predictors of later academic achievement than literacy skills, attention, and social-emotional behaviors (Romano, Babchishin, Pagani, & Kohen, 2010).

Teaching Students with Math LDs

Prior to the 1960s, educators acknowledged that there were students who were “slow learners” in mathematics. Most of these students were able to master the math goals and objectives under the standard curriculum of the time, which was delivered using a behavioral approach. For students who experienced difficulty in math, it was common for teachers to engage in repeated instruction and to offer extended time for completing assignments. The majority of slow learners showed some benefit from these accommodations and progressed through the standard curriculum. For those students who required more intensive services, an assessment was completed by a skilled clinician in order to determine the specific deficit or set of deficits present and a plan for remediation was made. Remediation techniques ranged from visual-motor perceptual training to the designing of a task analysis to break down areas of deficit even further in an effort to encourage mastery (Haring & Bateman, 1977). As the term learning disability was developed and defined, researchers began to document prescriptive methods in mathematics applicable to students with LD. Most of these researchers were skeptical of discovery methods because they did not help teachers select topics that should be taught to learners who, by definition, could not learn in the same manner, much less the same amount of content, as the rest of the students in the class room (Bruner, 1966; Woodward, 2004). It was suggested that in addition to verbal and symbolic modes of instruction that teachers make use of manipulatives, pictorial representations, and examples for the student's cultural or ethnic background (Glennon, 1973). Teachers were also encouraged to structure their lessons around a single concept. Each lesson or unit should start with studying the concept on its most basic level and then move to more complex examples (Bloom, 1956; Gagne, 1970). For slow learners, the position was adopted that teachers needed to carefully select and target specific instructional objectives and recognize that the amount of material to be mastered over time would be less than that of more capable students (Glennon & Wilson, 1972).

Research in the 1980s on math LDs investigated generalized interventions. Researchers were interested in the application of strategy instruction, direct instruction, and curriculum-based measurement. Studies of the time tended to focus on the generalized use of these interventions rather than a detailed analysis of mathematical topics (Woodward, 2004). For most of the 1980s, behaviorism was the predominant theoretical framework and the focus was on the use of modeling, instructional prompts, and key word strategies to assist with discrimination of basic math operations (Cybriwsky & Schuster, 1990; Gleason, Carnine, & Boriero, 1990; Sugai & Smith, 1986). In the 1990s, researchers began to focus on interventions specific to single topics in mathematics. In addition, some researchers began to investigate academic and non-academic interventions that allow a student with a learning disability to compensate for the processing deficits believed to underlie math LDs (Geary, 2003, 2005).

Mathematics and English Language Learners

The sociocultural theory of Vygotsky (1978) proposed that language is a tool for communication as well as reflection and thinking. Teaching and learning require that thought and ideas be clearly communicated through the effective use of language. Within the classroom, there is educational discourse and educated discourse that is occurring between the teacher and the students (Mercer, 1995). Language plays a particularly important role in the learning of mathematics. Mathematics learning involves learning words and using terminology that are related to mathematics (Adler, 1999). Students need to be able to communicate mathematically, and in order to do this, they must have a strong grasp of oral and written language as well as the language of mathematics (Setati, 2005).

Cummins (1980) differentiated between two types of language proficiency: Basic Interpersonal Communication Skills (BICS) and Cognitive/Academic Language Proficiency (CALP). BICS refers to knowledge of those aspects of language that are cognitively undemanding in interpersonal situations. These include basic rules of pronunciation and grammar and the common vocabulary of the language. CALP refers to the ability to understand and manipulate language in academic situations. For students who are learning a new language or who speak more than one language, learning can be both enhanced and distracted by the interplay between the two language codes (Cummins, 1979). Students who are not fluent in either language tend to experience difficulty as they move further along in mathematics (Ellerton & Clarkson, 1996). These students are generally able to acquire basic math calculation skills with little difficulty, but over time they score low on measures of math reasoning because they are unable to communicate with or understand the language and vocabulary of mathematics (Poon, 2004; Rowe, 2004). For these students, a substantial amount of class time and cognitive resources must be devoted to translating math problems and content from textbooks, especially mathematical terms (Lim & Presmeg, 2011). Because of the impact that language has on math achievement, a student's language proficiency must be considered when making instructional decisions and selecting assessment tools for measuring math achievement. When assisting students who are English language learners, it is important that math intervention and assessment be presented in the child's dominant language (Rhodes, Ochoa, & Ortiz, 2005).

Metacognition and Self-Regulation

What is metacognition?

Research on strategy use and instruction designed to teach metacognitive strategies began to appear at the end of the 1980s. These strategies are important for learning in general, but were found to be especially important in the area of mathematics (Hutchinson, 1993). General and task-specific strategies were found to be important and an area that required explicit instruction within the context of a relevant math lesson. These methods enhance transfer by helping students internalize meaningful strategies and facilitate problem representation (Goldman, 1989). The use of strategies to enhance learning and retention is a critical component of metacognition and the development of metacognitive skills. Metacognition is the knowledge and active regulation of one's own cognitive processes (Flavell, 1976, 1979). Cognition can be loosely defined as "the things that take place in one's head." These processes are extremely rich and complex and include the "representation of knowledge, language processing, image processing, question answering, inference, learning and memory, problem solving, and planning" (Schoenfeld, 1987, p. 1). Metacognitive skills are procedures or strategies that a person applies to monitor and control cognition (Desoete & Veenman, 2006).

Metacognition and Intellectual Ability

There has been some debate as to the relation between intellectual ability and one's use of metacognitive skills as predictors of learning (Veenman, Elshout, & Meijer, 1997). An individual's use of metacognitive skills is related to intellectual ability to a certain extent, in that students with above average intelligence are more likely to use metacognitive skills and have them in their "cognitive toolbox," but all students profit from moving through an academic task in a careful, step-by-step manner (Veenman, et al., 1997; Veenman, Prins, & Elshout, 2002). The primary difference appears to be that students with above average intelligence are more likely to acquire metacognitive skills naturally with little or no instruction as evidenced by the significant difference in metacognitive strategy usage between intellectually gifted and average students (Cheng, 1993; Hannah & Shore, 1995; Shore & Dover, 1987; Span & Overtoom-Corsmit, 1986; Zimmerman & Martinez-Pons, 1990). Yet, knowledge monitoring and metacognitive functioning of students with learning disabilities is less adequate relative to the metacognitive functioning of regular students (Slife, Weiss, & Bell, 1985). Therefore, it appears that IQ mediates metacognition but does not explain it (Berger & Reid, 1989). When students are placed in a situation of high task novelty or task difficulty, then the task suppresses the impact of intelligence on learning performance. This is because in an unfamiliar or difficult situation, there is no material available for an individual's "cognitive toolbox" to act upon, and the individual is forced to operate in a heuristic mode. Metacognitive skillfulness, rather than intelligence, is important during the early phase in the learning process (Veenman & Elshout, 1999; Veenman, et al., 2002). When completing tasks during later phases of the learning process, intelligence becomes a stronger predictor of performance (Veenman, 2006).

Metacognition Skills and Mathematics

Metacognitive skillfulness, and in particular the ability to use self-regulation strategies, is important during arithmetical problem solving situations (Vermeer, et al., 2000). Problem solving situations can be identified based on two conditions. First, there is a difference or distance between the initial starting point, which is considered insufficient, and the final situation where individuals want to go. Second, the procedure for reaching the final situation or goal is not an easy procedure and is not necessarily based on a previously known routine (Newell & Simon, 1972). Two groups of strategies and their relation to arithmetical problems have been investigated, forethought strategies and strategies for control and regulation (Patrick, Ryan, & Pintrich, 1999).

Forethought strategies are strategies used to anticipate and prepare for taking action and include goal setting and planning (Winne, 1996). Goal setting involves deciding what has to be reached and what has to be the final result (Lemos, 1999; Zimmerman, 2000). Goal setting allows the individual to select procedures based on whether or not they will lead to the end result (Pintrich, 2000). Goal setting serves as a reference, allowing the individual to evaluate and monitor possible actions while solving the problem (Winne, 2001; Winne & Perry, 2000). Planning is the process where an individual considers the sequence of activities for completing a task before the task takes place (Prawat, 1989). Planning is useful prior to completing any task, especially complex tasks. Planning allows complex processes to be broken down into steps that will be approached separately. For example, when completing arithmetical problems, each step involves using one arithmetic operator or working with specific quantities that make up the problem as a whole (Pintrich, 1999; Winne, 2001; Winne & Perry, 2000).

The two strategies of control and regulation are also useful in arithmetical problem solving, allowing an individual to supervise and adapt the application of planned actions as necessary in order to succeed (Baker & Brown, 1984; Boekaerts, 1996). The strategy of control is used to observe and evaluate the ongoing actions and its results (Zimmerman, 2000). Control is a multi-dimensional construct and the most complex strategy of self-regulation (Pintrich, 1999; Thiede, Anderson, & Therriault, 2003). Four types of control have been defined within the context of arithmetical problem solving: monitoring, evaluation, control of operations, and verification (Pintrich, 1999, 2000). Monitoring is an observation of some characteristic during an ongoing action. It allows the individual to notice when something unusual or unexpected happens and allow the individual to make modifications in the ongoing action when needed. It is monitoring that allows an individual to identify specific errors or an unexpected result (Baker & Brown, 1984; Patrick, et al., 1999; Pintrich, 2000). The evaluation of the achieved progress toward a goal is intentional and requires conscious control. The individual asks him or herself questions like "Have I answered the question?" or "Where am I in the procedure toward reaching a solution?" (Bandura, 1986; Zimmerman, 2000). The control of the operations is a periodic control procedure aimed at verifying that the choice of arithmetic operation is correct. The individual assesses the operation to ensure the appropriateness of the operation and its correct translation toward arriving at the final solution. The individual asks questions like "Was that what I was supposed to do?" after completing an operation to verify its appropriateness and asks "Did I perform the operation using the appropriate quantities?" to verify its correct translation (Carver & Scheier, 2000; Winne, 1996). The final step, verification of the results, is a retrospective conscious form of monitoring. The individual applies their knowledge of calculation procedures and conceptual knowledge of numbers to look for errors and verify any calculations (Kluwe, 1987; Zimmerman, 1999, 2000).

Regulation is using information collected by the four control strategies in order to adapt one's actions and reach the goal more efficiently and more accurately. Self-regulation is dependent upon the four control procedures (Baker & Brown, 1984). Whereas the control procedures can take place on a conscious or semi-conscious level, the self-regulation that follows is mostly conscious (Flavell, 1981, 1987). All of these strategies, while conceptually specific, appear to be interdependent. Planning cannot be done without goal setting, planning and goal setting must be in place before control strategies can occur, and regulation strategies need information collected by the control strategies. All of these strategies contribute to a global procedure that produces efficient self-regulation (Baker & Brown, 1984; Flavell, 1987). Goal setting and control strategies, particularly the control of operations, have been found significant predictors of arithmetical problem solving at the elementary school level. By middle school, planning, goal setting and control strategies are all predictors of arithmetical problem solving (Focant, Gregoire, & Desoete, 2006).

Learning and Study Strategies

What are Learning and Study Strategies?

All of the strategies of control and regulation are pertinent to a related area of research, the study of learning strategies. Learning strategies are behaviors of a learner that are intended to affect how the learner acquires new information (Mayer, 1988). The terms learning strategies, study skills, and study strategies are often used interchangeably. The difference is that learning strategies are used to enhance encoding of information as it is presented and encompasses approaches to many areas of learning, such as reading comprehension, writing, and note taking.

Study skills are steps that are specific to a particular task. Study strategies are a more global approach to a learning task and refer to a specific subset of behaviors that facilitate the learning of previously presented material (Gettinger & Seibert, 2002). Cognitive and metacognitive strategies encompass both learning strategies and study strategies, which are both used in school and learning environments, but they also include more global strategies that are used in home and work environments (Garner, 1988).

There are seven identified study skills requiring explicit instruction. These tasks are: getting organized, following school rules and procedures, using time management, listening in class, reading assignments, writing papers, and preparing for tests (Gall, Gall, Jacobsen, & Bullock, 1990). Students need to be able to develop a strategy and to apply it in order to identify important information, to make associations when learning, to make use of a variety of resources when a concept is not understood, and to use strategies for memory and encoding (Alexander & Murphy, 1998). Student academic performance is impacted by effective use of study strategies, and student use of study strategies is strongly influenced by the quality of learning experiences. In particular, instructors who are explicit when telling students about the types of strategies required for successful completion of a course and who emphasize within instruction and course assignments the concepts that have been identified as important encourage strategy use and foster academic success (Ning & Downing, 2010). Strategy use also appears to become more sophisticated as students progress through the curriculum. For example, students in the upper elementary grades report using and engaging in more advanced study strategies than students in the lower elementary grades. (De Corte, Verschaffel, & Op't Eynde, 2000; Waeytens, Lens, & Vandenberghe, 2002). When responses between males and females are compared, females tend to report more learning, study, and self-regulatory strategies than males (Charles & Luoh, 2003).

There is some evidence that strategy use and learning behaviors in mathematics may be related to personality type. Students who score high on measures of Conscientiousness tend to spend more time on math homework and report using more study and learning strategies. Students who score high on Agreeableness show no difference in the number of study and learning strategies that they report using, but like students who score high on Conscientiousness they report spending more time on math homework. Students who are Emotionally Stable tend to procrastinate more when compared to students who score high on Neuroticism, but on measures of study skills and behaviors, the answers provided by students who are Emotionally Stable suggest that they use the time they spend on math activities more efficiently. Finally, students who score high on Extraversion report using more surface strategies and fewer critical thinking strategies but do not differ in the amount of time they spend on homework when compared to students scoring low on Extraversion (Lubbers, Van der Werf, Kuyper, & Hendriks, 2010).

In the area of mathematics, the use of study and learning strategies can enhance problem-solving skills. There is evidence to suggest that the more strategies a student uses the better they perform on tasks involving math problem solving and that exposure to multiple strategies enhances math achievement. For example, students who use text-based examples and pictorial examples when reviewing mathematical concepts perform higher on measures of math reasoning than students who use only a text-based approach (Scheiter, Gerjets, & Schuh, 2010). Students in general and special education benefit from practice and coaching of reasoning and deduction strategies (Kenny & Faunce, 2004). Direct instruction of reasoning and deduction strategies is particularly important for students in special education. Students with learning disabilities and emotional and behavioral disorders who were provided direct instruction of strategies to use during problem solving situations scored higher than students in control groups on measures of math reasoning (Henley, Ramsey, & Algozzine, 2006; Hughes & Deshler, 1993; Hughes & Schumacher, 1991). One approach that has been found particularly effective is the use of mnemonic strategies. Special education students who learned the mnemonic strategy PIRATES (Prepare to succeed, Inspect the instructions, Read, remember, and reduce, Answer or abandon, Turn back, Estimate, Survey) scored at or above the mastery criterion on measures of math achievement that were based on the NCTM standards (Hughes & Schumacher, 1991; Mastropieri & Scruggs, 1994). For students with mild and moderate intellectual and developmental disabilities, there appears to be a functional relationship between strategy instruction, the number of strategies students report using, and percent of items correct on measures of reading and math achievement (Kretlow, Lo, White, & Jordan, 2008).

Several concerns have been expressed about traditional methods for teaching students strategies for reasoning and deduction. First, it has been common practice for teachers to teach students one procedure for solving a particular type of problem. In addition, students are often assigned a page of problems that are all the same type and that can be solved using the same type of strategy. This is not consistent with how problems are presented in real-world problem solving situations, so exposure to multiple strategies and different types of problems has been found to enhance learning of mathematics (Rittle-Johnson & Star, 2007; Silver, Ghousseini, Gosen, Charalambous, & Strawhun, 2005; Star & Rittle-Johnson, 2009).

Another concern is the reliance many instructional approaches have on the use of key words, such as the word all suggesting addition. The use of key words focuses on surface level features of a problem and does not encourage that students understand the deeper meaning or structure of the problem. Without this deeper understanding, students are not able to make sense of the word problem and apply those aspects of it that exist in novel problem solving situations (Van de Walle, 2007). A third concern is the use of a general problem solving heuristic or model that includes a series of general steps, such as Polya’s (1990) four step model: Understand the problem, Devise a plan, Carry out the plan, and Look back and reflect. Such general models do not lead to enhanced achievement because they do not emphasize the specific elements within a problem that are critical for successful problem solving (Lesh & Zawojewski, 2007; Schoenfeld, 1992). A schema-based instructional approach, which focuses on identifying the important words or components within a problem and developing problem solving models that are specific to different classes of problems, such as problems requiring ratio and percent, has been found to remedy these concerns (Jitendra et al., 2009; Rojas, 2010).

Organizational Skills

Getting organized involves the use of behaviors designed to help the student “(a) plan and manage activities within a time frame, (b) systematically arrange objects and assignments within space for rapid retrieval, and (c) structure an approach to a task” (Zentall, Harper, & Stormont-Spurgin, 1993, p. 112). Organizational skills are learned through explicit instruction and collaboration between teachers and parents (Bryan & Nelson, 1995). Across all levels, teachers need to model good organizational skills by keeping their classrooms clean and organized. School wide strategies need to be in place to keep common areas neat and orderly (Boller, 2008).

At the elementary school level, teachers must develop a system to help students keep track of assignments and upcoming tests. Such a system usually involves an assignment sheet that has a written description of daily homework assignments and written reminders of upcoming tests. In Kindergarten through Second Grade, these sheets are usually more effective when teachers have filled them out before distributing them to students. Starting in Third Grade, teachers should begin to foster more independence by having students take on more of the responsibility for filling in the assignment sheet. This can be done either by providing students with an assignment sheet that is partially complete, requiring students to fill in the missing information, or by having students write down each assignment (Jayanthi, Sawyer, Nelson, Bursuck, & Epstein, 1995).

Throughout the upper elementary grades, teachers can assist students with getting organized and keeping track of assignments by writing assignments down on the board. In addition, most students at this level will need for their teachers to monitor the completion of the daily assignment sheet to ensure that it gets filled out (Polloway, Epstein, Bursuck, Jayanthi, & Cumblad, 1994). Once students are at home, parents should review the daily assignment sheet and assist young children with keeping track of their homework assignments. Teachers and parents should devise a system for how assignments should be stored when being transferred to and from the classroom. Such a system might involve students having one folder designated as the "Homework Folder" where all assignments to be taken home are stored. If the folder has two pockets, one pocket can be used for storing assignments that need to be completed and one pocket can be used for assignments already completed (Dorminy, Luscre, & Gast, 2009; Singh et al., 1995).

Organizational strategies allow a student to come prepared for class and keep up with daily assignments (Slade, 1986). Students who have a strategy for organizing their work are more likely to have more time to devote to academic tasks and are more likely to complete homework assignments and turn in their work (Hughes, Ruhl, Schumaker, & Deshler, 2002). As students become able to take on more of the responsibility for organizing their materials and keeping track of their assignments, parents and teachers should continue to check in with students to keep them from getting behind (Nicholls, McKenzie, & Shufro, 1994). This is particularly true with students who have a learning disability or problems with attention (Deslandes, Royer, Potvin, & Leclerc, 1999). Even as students enter college, instructors should continue to assist students by including due dates for assignments on course syllabi, notifying students of any changes well in advance of the new due dates, and providing students with frequent reminders of upcoming tests, papers, and projects (Bryan, Burstein, & Bryan, 2001).

Organizational skills are indirectly related to math achievement. Students who are more organized tend to learn the procedures for solving different math problems quicker than other students (Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). They tend to write out all of the steps required for solving a math problem by hand, and their teachers are more likely to provide them with partial credit due to being able to see their work and the process they used when solving a problem. Partial credit then leads to higher grades in their math courses (Cobb, Peach, Craig, & Wilson, 1990).

Time Management

Time management skills are a special subset of organizational behaviors (Zentall, et al., 1993). Effective time management skills are associated with higher course grades (Brackney & Karabenick, 1995; Zimmerman, Greenberg, & Weinstein, 1994). Given the fact that there is only a limited amount of time that students can devote to academic tasks and a fixed number of academic tasks that must be completed, it makes sense that students who are able to prioritize tasks and allocate time appropriately would be able to accomplish more academically. Many factors must be taken into account when prioritizing tasks and allocating time, including the length of the task, task complexity, deadlines, and resources needed (Britton & Tesser, 1991). Behaviors associated with time management include setting attainable goals, setting accurate timelines, prioritizing tasks, organizing and planning a schedule, arriving on time to class and other obligations, completing work on time, providing self-rewards or incentives for work completion, and breaking down tasks into manageable parts (Britton & Tesser, 1991; Gall, et al., 1990; Macan, Shahani, Dipboye, & Phillips, 1990).

Teachers and parents need to play an active role in helping students organize materials, adopt realistic expectations for how much time it will take them to complete assignments, and devote the time needed to complete their studies. This assistance should start in elementary school and continue through high school (Beer & Beer, 1992). External support is also important as students enter adulthood. In higher education, first-year students are more likely to return for a second year and remain enrolled in school until completing their degree when they have instructors who incorporate within class lectures and activities direct instruction on strategies for organizing materials and time management (van der Meer, Jansen, & Torenbeek, 2010).

One way teachers and parents can assist students at all levels develop skills for time management is help students schedule their time in such a way that they are able to meet all of their academic and non-academic obligations. At the beginning of the school year, parents should help their children measure the average amount of time they spend each night on all of their homework, as well as the amount of time needed for each subject area, by using a timer to measure the time spent studying and doing homework for each of their classes (Hood, Craig, & Ferguson, 1992). Having a baseline for how much time is spent on activities is important because the amount of time spent in the past predicts how much time will be needed when completing similar activities in the future. Parents and students also need to be aware that most people require less time on activities involving topics that are easy or familiar to them and more time for new or more difficult topics (Swanson, 2011). Once an average amount of time has been determined for each day or week, parents should assist their child with developing a schedule for doing homework, eating dinner, leisure activities, extracurricular activities, and other activities that require a portion of the child's time outside of the school day. In addition, parents should ensure that their children are getting at least six to eight hours of adequate sleep and are including within their schedule a time to go to bed and wake up (Hood, et al., 1992).

Parents should help their children prioritize and set a limit on the number of activities they are involved in outside of the school day. In doing so, parents teach their children to avoid scheduling too many obligations and becoming over committed (Aries, McCarthy, Salovev, & Banaji, 2004). For many high school students, the issue of employment outside of school becomes an issue, and parents should assist their adolescent and emerging adult with learning to balance work, school, and extracurricular activities (Dolton, Marcenaro, & Navarro, 2003). In addition, students should be encouraged to limit the amount of time they spend using electronic media and social networking sites. Students who multitask, doing homework or studying while engaging in social networking tasks such as sending and receiving text messages, retain less information than students who study and do not multitask (Kirschner & Karpinski, 2010). Students who have learning disabilities and attention difficulties will require more external support initially in order to learn the skills necessary to manage their time. Once they are consistently demonstrating these skills, parents and teachers should begin to fade their level of support (Bryan, et al., 2001).

Mathematics is a subject area where basic concepts build on more advanced concepts. Because of the unique nature of mathematics, one of the best ways for a student to improve their performance is by scheduling adequate time engaged in math activities outside of the classroom.

Just like many other skills, practice increases the accuracy in one's performance and allows one to perform more efficiently (DesJardins, Ott, & Kim, 2010). Practice outside of the classroom can help students learn how to manage their time during in-class activities and test-taking situations, particularly test-taking situations that are timed or time-limited (O'Melia & Rosenberg, 1994).

Reading and Comprehension

Explicit instruction related to the study skills for reading assignments occurs within the context of general reading instruction. During the early years of elementary school, reading instruction focuses on learning how to read and the acquisition of basic reading skills. Students are taught the oral language skills that are necessary for knowing how to utilize language. They then learn the concept that letters represent sounds and use sound-spelling relationships. The final stage of learning how to read involves learning reading decoding skills and basic strategies of reading comprehension while at the same time increasing reading fluency (Chall, 1983; Good, Simmons, & Smith, 1998). During the later elementary years, starting approximately during the third grade, a transition occurs and reading instruction begins to focus less on learning to read and more on reading to learn. At this point, reading instruction begins to focus on expanding vocabulary, developing strategic habits for monitoring comprehension, and building the necessary background knowledge to facilitate comprehension (Chall, 1983; Simmons & Kame'enui, 1998).

Comprehension is necessary for answering factual, rote level questions, as well as questions that involve making predictions, finding the main idea of a paragraph, or summarizing a section or chapter (Klingner, Urbach, Golos, Brownell, & Menon, 2010). Comprehension is affected by variables that come from two sources: the characteristics of the text and the characteristics of the reader (Billingsley & Wildman, 1990). Of the two main types of text, narrative and expository text, students are most familiar with the structure and components of narrative text. This is because most children have heard stories early in their life and are able to anticipate and look for what might happen next in the story (Bakken & Whedon, 2002; Gersten, Fuchs, Williams, & Baker, 2001). Expository text is the type of reading students usually encounter within the context of math problem solving or when reading a math textbook. Whereas one structure is generally followed in narrative text, expository text can follow several different patterns. The most common patterns that have been identified include: main idea structure, list structure, order structure, compare/contrast structure, and classification structure (Bakken & Whedon, 2002). In addition, while a narrative text generally follows one structure throughout, expository text can change structures several times within a selection and may not fit perfectly into one of the common structures (Gersten, et al., 2001).

Children with learning disabilities have trouble recognizing text structures, both expository and narrative, and develop recognition of text structures at a much slower rate than other children (Cain, 1996; Englert & Thomas, 1987). They also have poor vocabulary knowledge, limited background knowledge, poor reading fluency, and poor task persistence (Gersten, et al., 2001). Reading comprehension strategies involve many self-regulatory behaviors and metacognitive skills, such as comprehension monitoring, self-checking during reading to detect errors and monitoring understanding, and the active use of strategies to regulate comprehension (Baker & Brown, 1984; Billingsley & Wildman, 1990).

When teaching strategies for reading comprehension, it is important for teachers to include strategies to assist students with maintaining important information they read in long-term memory (Berkeley, Scruggs, & Mastropieri, 2010). In the past, special education reading instruction tended to focus on lower level comprehension skills, but recent findings have suggested that students benefit from teacher-directed instruction and questions that require and expose them to inferential reading comprehension strategies (Woolley, 2010). Exposure to higher level strategies in reading comprehension can enhance performance in mathematics, as problem-solving skills in mathematics have been associated with more advanced and flexible use of literary strategies (Farrington-Flint, Vanuxem-Cotterill, & Stiller, 2009). Students with learning disabilities are often limited in their knowledge and use of these strategies (Gersten, et al., 2001).

In the area of mathematics, students with deficits in basic reading skills, such as letter-word identification and phonological processing, tend to perform worse on tasks of math fluency, basic operations, and word problems than students with deficits in reading comprehension. This is true even when word problems are read aloud to the student (Vukovic, Lesaux, & Siegel, 2010). Reading and math achievement scores are highly correlated, and performance in reading at ages five and six are strongly predictive of reading and math achievement scores at ages eleven and twelve (Lee, 2010). Reading intervention programs designed to address reading comprehension and strategy use have been associated with higher scores on measures of reading comprehension and problem solving (Cantrell, Almasi, Carter, Rintamaa, & Madden, 2010). As with other scientific texts, teachers can improve comprehension of written text that is used as part of math instruction by pre-teaching to build topic knowledge, introduce new vocabulary, and model effective reading strategies. Pre-teaching has been found effective with students at all levels, including students at the undergraduate level (Cromley, Snyder-Hogan, & Luciw-Dubas, 2010)

Written Expression

The skill of writing involves the "coordination and integration of multiple processes, including planning, production, editing, and revision. Composition requires prior knowledge of topic, genre, conventions, and rules as well as the ability to access, use and organize that knowledge when writing" (Montague & Leavell, 1994, p. 21). A number of models on the writing process exist, and most of them delineate five steps as making up the writing process. These steps are prewriting, drafting, revising, editing, and publishing (Gall, et al., 1990; Neubert & McNelis, 1986; Romano, 1987). All of these models involve some degree of planning and organization information prior to writing, writing at least one draft, revising drafts for content, editing drafts for grammar and punctuation, and producing a final copy (Tompkins, 1994). Teaching methods that focus on the writing process and writing strategies include instruction which focuses on building more complex sentences as well as using and internalizing scales, criteria, or questions to generate material. The most effective lessons involve inquiry activities, such as analyzing data, problem-solving, and generating arguments (Graham, Harris, MacARthur, & Schwartz, 1991; Graham & Perrin, 2007; Hillcocks, 1986) Students with learning disabilities do not use writing strategies to the extent that their non-disabled peers do. They spend less time planning and revising their writing, tend to write without pausing to reflect or think about what they have written, and are less likely to take the time to rethink or read over what they have written (Faigley, Cherry, Jolliffee, & Skinner, 1985; Graham, Schwartz, & MacArthur, 1993; MacArthur & Graham, 1987).

Writing is becoming more common in math instruction at all levels, but especially in advanced mathematics (Geary, 2004). Creative writing skills are associated with innovative thinking and cognitive flexibility during problem solving situations (Chen & Zhou, 2010).

Incorporating writing activities into math instruction facilitates learning (Deshler, Palinscar, Biancarosa, & Nair, 2007) and promotes critical thinking (Tierney & Dorroh, 2004; Tierney & Shanahan, 1996; Tierney, Soter, O'Flahavan, & McGinley, 1989). Classroom writing activities increase vocabulary and comprehension of math concepts. They allow students to make connections and organize their thoughts and encourage integration of content areas across the curriculum (Coker & Lewis, 2008; Graham & Perrin, 2007). Writing instills in students strong organizational skills, and organizational skills are necessary for managing complex problem solving situations (Thompson, Kersaint, Richards, & Rubenstein, 2008). Difficulties in writing could exacerbate those already experienced in math (Geary, 2004). For this reason, math content specialists should be familiar with techniques for helping struggling writers write about mathematics and develop in all of their students mathematical literacy (Thompson, et al., 2008).

One technique, Quick Writes, has been an effective technique for incorporating writing-to-learn activities in math and science classes at the secondary level. Quick Writes provide students an opportunity to recall what they learned, elaborate and clarify on important concepts, and question information (Fisher & Frey, 2004; Tierney & Dorroh, 2004). Using a mnemonic like TREE (Topic Sentence, Reasons—Three or more, Explain, End) to structure Quick Write assignments in math and science classes has assisted students with and without learning disabilities learn how to structure their writing in a way that supports content learning (Mason, Kubina, & Taft, 2011). Similar systems for structuring writing assignments have been found effective with English Language Learners (Chien, 2010).

Note Taking and Listening Strategies

Related to reading assignments and writing papers is the development of note-taking, listening, and comprehension strategies. Note taking emerges during elementary school but becomes increasingly important during secondary school and college as the preferred method of instruction becomes teacher lecture. Note taking skills and strategies for text marking are strategies associated with good listening skills and the ability to discern from important versus non-important information. Both involve taking information presented and then restructuring it in a way that is meaningful to the learner and promotes efficient learning (Porte, 2001).

Listening is comprised of both language, environmental, and behavioral components (Bamiou, Musiek, & Luxon, 2001). The student has to have the receptive vocabulary necessary to understand the message being presented (Baldry & Hind, 2008). Students with speech and language impairments tend to perform lower than expected on measures of receptive vocabulary, as well as receptive grammar, repetition of words, and verbal working memory. For this reason, students who demonstrate trouble following verbal directions or understanding verbal instruction should be evaluated by an expert in language development, such as a speech-language pathologist (Ferguson, Hall, Riley, & Moore, 2011).

In order for a listener to benefit from verbal directions or instruction, the environment must be free of extraneous visual and auditory stimuli that could distract the listener from receiving the message. Students with attention problems have a difficult time ignoring extraneous visual stimuli, and students with auditory processing disorders find it particularly difficult to discriminate relevant and irrelevant sounds (Ghanizedah, 2009; Riccio, Cohen, Garrison, & Smith, 2005). Finally, there are behaviors associated with good listening. These behaviors include sitting still, facing the speaker, and making eye contact with the speaker (Dawes & Bishop, 2009).

When students with learning disabilities are compared to students without learning disabilities, students with learning disabilities perform significantly worse in terms of the type and amount of notes taken during science and math instruction, as well as how they perform during situations where they are tested over the material on which they were expected to take notes (Boyle, 2010). In general, students do not take notes during math instruction because they consider the examples from the textbook to be a source of math notes (Grossman, Smith, & Miller, 1993), but note taking in math class has many advantages for students. By taking notes, students have written material that can serve as the foundation for further study and help enhance memory of the material presented. It provides a record of the content covered and allows students to review, restructure, and analyze the subject matter. Note taking also helps ensure students remain focused and alert during teacher-directed instruction (Isaacs, 1994).

Note taking increases both immediate and delayed recall of information presented, helps students synthesize information, and note takers obtain higher test scores than non-note takers. For students of average or above average intellectual ability, personal notes lead to better recall and synthesis than borrowed notes or notes provided by the instructor (DeZure, Kaplan, & Deerman, 2001). Students, however, do benefit from instructors who make their lecture notes available, allowing the students to check their notes for accuracy (Maxwell, 1994). In addition, studying with other students and comparing other students' notes allows students to obtain information they might have missed while note taking (DeZure, et al., 2001).

Students who do take notes during math class tend to take notes that are incomplete and inadequate (DeZure, et al., 2001). Students also tend to engage in "cognitive dumping," which involves compartmentalizing information by chapter or topic, rather than seeing previous skills as building on new skills. Cognitive dumping may be effective in other subject areas but is generally not effective in math classes (Bosse, 2003). In order for students to learn a strategic way for taking notes during math instruction, it is necessary that instructors teach and model an effective note-taking strategy (Brinkmann, 2003). To increase student attention and note taking accuracy, instructors are also encouraged to vary instructional activities so that students are not expected to attend to the instructor and take notes for longer than five to ten minutes (Wilson & Korn, 2007).

One method that has been found effective is the Math Notebook System. Instruction for taking notes using the Math Notebook System starts in the upper elementary grades and provides students with a system they can continue to use up through their required college math coursework. Notes are taken, organized, and stored in a binder or spiral notebook. Students start by dividing the page into three columns. In the first column, students indicate and define each step required for solving a math problem. In the middle column, students write the problem and the mathematical procedures for solving it. If the problem is a word problem, they write out the problem, even if the problem is available in the textbook. In the third column, students write any definitions or mathematical principles that are introduced or relevant to solving the problem. Between classes, students also write their own personal notes in this column, such as insights about how the problem relates to previously learned material (Eades & Moore, 2007; Wieman, 2011).

A note taking system has also been developed for students in the primary grades. Notes can be hand-written or electronic, and teachers can choose to use power point slides and the notes section underneath the power point slides. The system starts with teachers providing students with keywords and bullets. If notes are to be handwritten, teachers provide students with a worksheet that already contains the keywords and bullets. If the notes are to be taken using power point slides, then the slides contain the keywords and bullets. Either independently or with teacher assistance, students write in definitions for the important keywords or fill in the bullets with important key points. During math instruction, teachers would also include sample problems, and the student would be expected to fill in the steps for solving the problem as the teacher solves it in front of the class. Next, the teacher provides a section on the worksheet or a blank power point slide that allows students to write a summary or reflection on the information presented at the end of the lesson. Below the written summary or reflection is a section for students to draw a picture or graphical display of the information presented. For some students, this may require collaboration with peers or assistance from their teacher. Students take these worksheets home and are expected to discuss the keywords and key points with an older sibling or adult caregiver. At the bottom of the worksheet is a section for the child or caregiver to write any questions that are elicited as a result of this discussion (Fontichiaro, 2011; Moore, 2011). Guided note systems such as these have been found to increase student attention, note-taking accuracy, and improve academic performance (Konrad, Joseph, & Eveleigh, 2009).

Test Taking Strategies

The last learning strategy that is becoming increasingly more important is the development and use of test-taking strategies. State-wide assessment programs are playing an important role in the accountability of schools, and several states have developed assessment standards that students must meet in order to progress to the next grade level as well as minimum standards for graduation. Ultimately, these tests are designed to measure content knowledge, but several factors may impact a student's score. These factors include the student's level of confidence, motivation for success, and test-taking skills (Weinstein, Husman, & Dierking, 2000). Test-taking strategies are skills that allow a student to recognize and compensate for differences in test format and in the testing situation itself in order to improve his or her score.

Four test-taking strategies are applicable to most testing situations. These include: time-using strategies, error avoidance strategies, guessing strategies, and deductive reasoning strategies (Millman, Bishop, & Ebel, 1965). Time-using strategies allow the student to make effective and efficient use of time during a test. These skills are of particular importance during test-taking situations in which there is a time limit for completion of the test items. Examples of these strategies include monitoring the amount of time, completing test items that you know and skipping items for which the answer is not immediately obvious, and not spending too much time on a particular question or section.

Error avoidance strategies are used to minimize the number of points lost due to mistakes or careless errors. They include accurately reading and understanding directions, accurately selecting answers, and checking over the test for mistakes. Guessing strategies increase a student's chance of answering a question correctly. Deductive reasoning strategies help a student arrive at an answer by using item content, eliminating unlikely answers, and recognizing and discriminating between similar responses in order to select the best response (Mastropieri & Scruggs, 1992). Two additional test-taking strategies, intent consideration strategies and cue using strategies, are applicable to specific test taking situations or a particular test author (Millman, et al., 1965). Intent consideration involves the level of awareness the student has of the intent understanding of idiosyncrasies of test and item construction for a specific test author (Mastropieri & Scruggs, 1992).

Some research has investigated test-taking strategies as they relate to mathematics. On math tests involving subtraction, students with high achievement scores used fact retrieval when solving problems involving minuends from 11 to 18, relying more heavily on long-term memory, where as students with low achievement scores relied on reconstructive strategies, such as counting with their fingers, relying more heavily on short-term memory. While it is possible for both high and low achieving students to arrive at the correct answer, high achieving students use the more efficient strategy of fact retrieval (Thevenot, Castel, Fanget, & Fayol, 2010). On math tests that require students to solve complex division problems, two types of strategies were identified. Written strategies have been found more effective in no-choice situations when students must compute the answer without the assistance of a list of possible answer choices. Mental strategies can be effective on multiple-choice tests or when students are given a list of possible answer choices. Girls were more likely to use written strategies where as boys were more likely to use mental strategies, however, both boys and girls identified with average or above average scores on measures of math achievement were more likely to use written strategies on more difficult items (Hickendorff, van Putten, Verhelst, & Heiser, 2010).

In general, when confronted with math problems similar to those presented during math instruction or in a math textbook, students tend to use strategies similar to the ones taught by their teacher or presented in their textbook. Essentially, students use a learned algorithm when solving the problem. The more similar a test item is to other problems a student has solved correctly, the more likely these learned algorithms will allow the student to come up with the correct solution (Boesen, Lithner, & Palm, 2010). Effective use of test-taking strategies leads to more correct responses on standardized tests. When test items are answered incorrectly, responses are more likely to be categorized as incorrect but reasonable by test reviewers (Petridou & Williams, 2010).

Academic Motivation

A student's motivation to learn should be considered when looking at success or failure in the classroom because of the role motivation plays in strategic learning (Weinstein, et al., 2000). Motivation has been found to predict strategy use, and conversely strategy use has been found to predict student self efficacy and level of motivation in mathematics and science (Pintrich & DeGroot, 1990). This relationship appears to be due to more elaborate use of strategies and deeper levels of processing. Students who have higher levels of self-efficacy are more confident in their ability, which increases their motivation to use more elaborate strategies, such as rehearsal and elaboration, which leads to deeper understanding and more engagement in mathematics and science (Berger & Karabenick, 2011).

Motivation has been defined based on many different orientations, but in general it can be defined as the "process by which the individuals' needs and desires are activated and, thus, directs their thoughts and their behaviors" (Alexander & Murphy, 1998, p. 33). It is affected by three components. First, the individual has to expect that by performing a particular behavior, he/she will achieve a successful outcome. Second, the individual has to be aware of the value or importance placed on the task. Third, the individual must associate a positive emotional process with performing the action (Dembo & Eaton, 1996). When students fail, they must determine if it was because they lack the ability or they did not put forth enough effort. This belief will serve as a guide for future actions. Children with learning disabilities often display learned helplessness, attributing their failures to a lack of ability that is stable across all academic areas and cannot be changed by the amount of effort on their part (Frieze, 1976; Miranda, Villaescusa, & Vidal-Abarca, 1997).

Educators should be concerned about children with unrealistic expectations regarding their performance, whether those expectations are low or high. Dweck and Leggett (1988) found that students with unrealistically low or high expectations about their ability do not put the effort into their work necessary to maximize their potential. This is particularly true of college students who often have unrealistically high expectations regarding their performance. Goal theory of motivation has suggested that student performance is motivated by two distinct types of goals, performance and mastery goals. Performance goals involve a view of learning as a means to an end. The student focuses on his or her ability and self-worth while evaluating his or her ability and performance throughout the process of learning. Students with this orientation are more focused on grades or how their work is evaluated by others, seeing a good grade as the desired end, rather than focusing on acquiring new knowledge or skills. Mastery goals involve a view of learning in which the student strives to learn new skills, attempts to understand his or her current level of performance, strives to improve his or her work, and develop a sense of mastery (Ames, 1992; Brophy, 2004).

A similar theory of motivation, self-determination theory proposes that motivation exists on a continuum with intrinsic and extrinsic motivation making up each extreme. A student is intrinsically motivated when he or she wants to learn as a result of curiosity, persistence in completing challenging tasks, and an innate desire to learn. A student is extrinsically motivated when he or she is motivated to learn based on grades or some external factor, such as approval from teachers or parents. In the middle of this continuum is amotivation, defined as a lack of desire to learn or complete an activity. Students fall somewhere along this continuum, and ultimately educators should attempt to instill in their students an internal motivation for learning (Deci & Ryan, 1985; Vallerand, Pelletier, Blais, & Briere, 1992).

There are a number of strategies for improving academic motivation in students. Strategies that students can use include self-talk, goal setting, and using preferred activities to reinforce time spent on academic tasks (Dembo & Eaton, 1996). At the classroom level, teachers can increase academic motivation by setting individual and class wide goals, allowing students to choose their work assignments from a list of assignments that focus on the learning objectives covered in class, and providing opportunities for students to engage in independent study of topics related to those covered in class (Brophy, 2004). Classroom strategies have been found to have the most profound effect on students' academic motivation (Brophy, 2004; Church, Elliot, & Gable, 2001). Academic motivation has been shown to increase in conditions that increase student perception of competence at school, promote individual choice and decision making as opposed to a sense of obligation and pressure, and provide regular feedback on student progress while demonstrating support and interest in the student (Guay, Ratelle, Roy, & Litalien, 2010). When teachers use goal setting to increase academic motivation, context specific goals have a stronger relationship with academic motivation and academic achievement than goals that are more global (Diseth & Kobbeltvedt, 2010). Efforts to increase academic motivation are important, especially for male students who generally report lower motivation than females (Preckel, Goetz, Pekrun, & Kleine, 2008).

In relation to mathematics, classroom environments that are caring, challenging, and mastery oriented lead to higher levels of math self-efficacy, academic motivation, and higher performance on measures of math achievement (Fast et al., 2010). Academic motivation has been shown to increase when teachers incorporate computer-based math instruction and games into their math curriculum. This is particularly true for male students. With English Language Learners, it is necessary that teachers use computer-based instructional programs and games that include instruction of math language and vocabulary in order for there to be a positive effect on academic motivation (Kebritchi, Hirumi, & Bai, 2010).

Test Anxiety

Test anxiety has an effect on performance during evaluative situations (Hembree, 1988). Test anxiety is considered a situation-specific trait, in that it only occurs during an evaluation (Spielberger, 1979). It can also be specific to one type of test or evaluative situation (Hong & Karstensson, 2002). Test anxiety has been described as having two different components: worry and emotionality. Emotionality is the physiological manifestation of anxiety, and worry is the cognitive component, the thoughts a student might have about failing a test (Liebert & Morris, 1967). Worry is the component of anxiety that has been found more detrimental to academic performance (Wine, 1971), although for many students it is experiencing emotionality that triggers the experience of worry (Spielberger & Vagg, 1995).

Four main theories have been developed to explain test anxiety. The cognitive-attentional model proposes that negative performance is due to excessive attention being placed on excessive worries, self-coping statements, concern about physiological reactions, and other thoughts that are irrelevant to the task and therefore interfere with task performance (Naveh-Benjamin, 1991; Wine, 1971). The learning deficit model explains test anxiety as being due to not having mastered the material, either due to inadequate time devoted to studying the material or inadequate study or test-taking skills (Hodapp & Henneberger, 1983). While this model is supported by evidence that poor study habits and test anxiety are related, it does not explain how students who are high achieving and who have good study habits can also experience test anxiety (Tobias, 1985). The dual deficit or information processing model explains test anxiety by combining the major premises of the two previous models. It attributes test anxiety to thoughts irrelevant to the task, difficulty encoding material and retrieving it during an evaluation, and skill deficits that produce feelings of anxiety (Jones & Pettruzzi, 1995; Naveh-Benjamin, 1991).

Finally, the social learning model suggests that test anxiety is the result of a student's beliefs about their ability to perform well on a test, level of motivation to perform well on the test, and real or perceived pressure from others, such as teachers or parents, to perform well (Marsh, 1990).

Measures of self-esteem are negatively correlated with measures of anxiety, and self esteem is highly correlated with academic achievement in English and mathematics (Newbegin & Owens, 1996). Children who report being test anxious are more likely to meet diagnostic criteria for anxiety disorders and also obtain higher scores on measures of symptoms of depression (Beidel, Turner, & Trager, 1994; King, Mietz, Tinney, & Ollendick, 1995). Test anxiety is experienced differently for high achieving and low achieving students. High achieving students tend to be anxious because of unrealistic expectations placed on them by other people, such as their parents or peers, while low achieving students report being anxious because of previous experiences of failure and expectations to fail in the future (Wigfield & Eccles, 1989). Treatment of test anxiety generally involves a combination of study skills training, anxiety management training, and teaching the student to discriminate between "facilitating anxiety" and "debilitating anxiety" (Annis, 1986; Decker, 1987; Wilson & Rotter, 1986).

Anxiety as it relates to mathematics is not a new construct. It has long been discussed as a subject-specific form of anxiety that occurs due to a perceived self-esteem threat in response to situations involving mathematics (Baloglu & Zelhart, 2007; Dreger & Aiken, 1957). Mathematics anxiety is found in people of all ages and ethnicities, but starting in middle school, it is more common in girls and women. For this reason, childhood is a critical time in terms of addressing mathematics anxiety (Ho et al., 2000). As early as second grade, children report that performance avoidance goals, which are the desire to avoid looking incapable or being negatively judged by peers, influence their behavior during math situations (Magi, Lerkkanen, Poikkeus, & Rasku-Puttonen, 2010). Poor calculation ability has been found to strongly correlate with clinical reports of math anxiety among children between the end of first grade and middle of third grade (Krinzinger, Kaufmann, & Willmes, 2009).

For children with math learning disabilities, levels of math anxiety are reported that are clinically significant, often to a point that suggests math fear or phobia. This is particularly true in situations where students are expected to decide quickly whether their solutions are correct or not (Rubinstein & Tannock, 2010). Anxiety is reduced when teachers emphasize the process for deriving a solution rather than the accuracy of the solution. In addition, teachers should avoid test-taking situations that are time limited and that overwhelm their students' working memory capacity (Ng & Lee, 2010). Perceived enjoyment of mathematics, enjoyment of the mathematics teaching method, and help with mathematics from competent tutors or parents help to alleviate mathematics anxiety (Birgin, Baloglu, Cathoglu, & Gurbuz, 2010).

Attention and Concentration

Attention is a necessary process in order for learning to occur, so it is also critical to success on any academic task (Riccio, Reynolds, Lowe, & Moore, 2002). It is identified as the first step in a number of theories of learning and has been identified as a precursor to memory, another process that facilitates learning (Reynolds & Voress, 2007). In school, students must be able to attend to academic tasks, attend to direct instruction and class lectures, and avoid distractions. Inattention is often attributed to children with Attention Deficit Hyperactivity Disorder, but is also common among children with other psychological disorders. Research finding a relationship between internalizing and externalizing disorders and academic underachievement has identified attention as a mediating factor (American Psychiatric

Association, 2000; Barriga et al., 2002; Hinshaw, 1992; Shaywitz & Shaywitz, 1992). Based on the effect attention has on learning, measures of attention should be included when assessing children experiencing academic difficulties, as well as those whose problems appear primarily due to behavior, as attention problems often manifest in the form of hyperactivity or defiance, or by severe internalizing symptoms (Barriga, et al., 2002; Hinshaw, 1992).

The ability to self-monitor attention and to adjust one's attention level to different learning environments is an important skill in the development of effective learning strategies (Alexander & Murphy, 1999). Effective learning strategies are dependent upon the ability to identify and attend to important information and monitor comprehension of new material (Reynolds & Shirey, 1988). Through the development of effective studying, note taking, and test-taking strategies, students come to view attention and performance on academic tasks as factors that are under their control. Efforts on the part of teachers and parents to increase interest in a subject and to help students see the value in learning the subject matter also helps increase efforts on the part of students to control attention. Interventions to assist students with attention problems are critical, particularly for male students who tend to score higher on measures of problems with attention(Biederman et al., 2002), as attention impacts learning strategies as well as emotional adjustment and regulation (Borden, Brown, Jenkins, & Clingerman, 1987).

There are a number of classroom strategies that have been found effective at increasing academic engagement in children with attention problems. These strategies work by getting students' attention, prompting students on where to focus their attention, reducing the number of distractions within the learning environment, organizing learning materials and teaching students how to organize their own materials, assisting students with the use of time management skills, and teaching strategies that are specific to different content areas (Teeter, 1998).

Attention plays a critical role in the learning of mathematics. Problems with attention are related to problems with accuracy, math fact errors, and procedural errors (Raghubar et al., 2009). Early measures of attention and other skills related to executive functioning, including shifting and inhibitory control, explain a substantial amount of the variability in early mathematical achievement at school (Clark, Pritchard, & Woodward, 2010). This suggests that the scaffolding of these skills may be a useful component in early mathematics education.

Response to Intervention and Curriculum-Based Measurement

What is Response to Intervention?

Response to Intervention (RTI) is appearing in public education policy because it is a population-based system for determining which students need more assistance. Such policies are already in place in health, food, and safety but have been less utilized in school settings (Doll & Haack, 2005). Population-based systems have many public welfare benefits because they call for universal screening for the identification of possible school difficulties (Coyne, Kame'enui, & Simmons, 2001, 2004; Coyne, Kame'enui, Simmons, & Harn, 2004) and the progress of all students is reviewed regularly to prevent students from “slipping through the cracks” (Biglan, Mrazek, Carnine, & Flay, 2003). Those students who require additional assistance are provided with interventions that have previously been shown to be effective. Newly developed interventions are used only when the student presents a problem for which there is no documentation of effective interventions and are implemented on a trial basis, similar to the manner in which treatments are validated by physicians in the medical field. The data-driven nature of RTI decreases the likelihood that these trial interventions will have a negative impact on the child. School personnel can expect that the child will experience some benefit from the intervention or the intervention will be discontinued if the data shows that the trial intervention is not working (Brown-Chidsey & Steege, 2005).

Models for Service Delivery Using RTI

Models for incorporating RTI typically involve identifying students who are at-risk of academic difficulties based on a mass screening of all students and repeated assessments of students in the same core area, such as reading or math. It is a dynamic model where identification is determined based on the assessment of ability change across time (Fuchs & Fuchs, 1998; Gresham, 2002b). There are a variety of programs available to assist with the implementation of RTI, and almost all of them were developed initially from public health models of disease prevention (Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007). These models were first used in school-wide applications designed to address and prevent behavior problems in children (Donovan & Cross, 2002).

Most RTI programs are based on a three-tier model of service delivery (Brown-Chidsey & Steege, 2005; Reschly & Ysseldyke, 2002). Tier 1 involves the delivery of high-quality instruction to all students and the screening and monitoring of all students in meeting specific educational outcomes (Gresham, 1999, 2002a, 2002b; Ikeda, Tilly, Stumme, Volmer, & Allison, 1996; Lane, O'Shaughnessy, Lambros, Gresham, & Beebe-Frankenberger, 2001; O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2003). Tier 1 services are able to meet the learning needs of approximately 75-80% of the students in a local community (Ogonosky, 2008). Those students needing additional assistance are identified based on the monitoring procedures included in Tier 1. These students are then served at Tier 2, where supplemental instruction and assessment are provided. The criteria used for indentifying students as eligible for Tier 2 services will vary depending on the local community, but students are identified based on data collected at either the benchmarking or progress monitoring phase of data collection. If high quality instruction is being delivered at Tier 1, a school campus can expect approximately 15-20% of its students to be receiving supplemental instruction at the Tier 2 level (Ogonosky, 2008). For the majority of students who are identified as at-risk, the supplemental instruction provided at Tier 2 will be sufficient for them to continue to demonstrate adequate progress within the general curriculum (Tilly, Reschly, & Grimes, 1999). A small percentage of students will require services at Tier 3. On any given campus, only 5-10% of the student body will move up to the Tier 3 level (Ogonosky, 2008). Tier 3 involves a rigorous, data-driven, intervention effort. By this time in the process, the child's parent should be involved and decision-making should occur through a collaborative process involving a team of school personnel and instructional specialists (Rosenfield, 2000; Rosenfield & Gravois, 1996; Tilly, et al., 1999). At Tier 3, the team may determine that the student needs special education services based on documentation that there is a discrepancy between the child's performance and the average level of performance demonstrated by his/her peers, that this discrepancy has not been resolved by high quality interventions implemented in general education, the programming elements or instructional intensity required to remedy this discrepancy are beyond the resources that can be reasonably provided in general education, and there is a clear need for the type of services provided in special education (Reschly & Ysseldyke, 2002). The critical eligibility criterion is resistance to intervention when rigorous standards have been established for quality of interventions (Gresham, 1999).

What Is Curriculum Based Measurement?

Closely related to RTI is curriculum-based measurement (CBM), a set of assessment methods that can be used for data collection at all three tiers of RTI (Fuchs & Fuchs, 2007).

CBM provides teachers with a reliable, valid, and efficient indicator of academic competence that can be used to gauge student standing at one point in time for the purposes of screening students for further intervention or to index student progress across time for gauging student response to instruction (Deno, 1985). Some curriculum-based measurement programs can be administered and scored on the computer, and teachers tend to be more satisfied with these systems than those with a traditional paper-and-pencil format (Fuchs, Hamlett, Fuchs, Stecker, & Ferguson, 1988). CBM is different from other classroom-based assessment in several critical ways. It is standardized or criterion referenced to the curriculum so that the behaviors to be measured and the procedures for measuring those behaviors are the same for every child, increasing the reliability and validity of the assessment (Fuchs & Fuchs, 1992). CBM is focused on repeated measurement of student performance occurring on a regular basis throughout the school year. The testing procedures remain the same and similar test content is used with each administration. Equivalent weekly tests are administered throughout the school year, allowing progress to be monitored systematically over time (Fuchs, Deno, & Mirkin, 1984). Finally, CBM is fluency-based so that students have a fixed amount of time to respond to test stimuli.

Fluency measures are useful for screening purposes because they make it easy to identify students who are struggling in the general curriculum. It does not allow teachers to identify the underlying reason for their struggles, but it is an indicator of poor response to instruction (Fuchs, Fuchs, Hosp, & Jenkins, 2001). When used for monitoring progress, it reflects the individual's capacity to perform critical behaviors within an academic subject area. The student's accuracy and ease of performing this behavior can be documented, and greater accuracy and ease can serve as an indicator that the student is demonstrating a positive response to instruction (Fuchs & Deno, 1991).

The use of CBM is based on behavioral research on the effect of behavioral fluency. According to behavioral fluency theorists, tasks that are mastered and performed quickly and accurately result in several positive outcomes or benefits (Binder, 1996; Johnson & Layng, 1992). Fluency allows the individual to perform a skill with automaticity, allowing cognitive mechanisms to be free to focus on the more complex aspects of the task at hand (Bloom, 1986; Dougherty & Johnston, 1996; Gagne, 1983; Hasher & Zacks, 1979; Wachsmuth, 1983). Curriculum-based mathematics measures have been highly correlated with measures of math computation, while curriculum-based reading measures have been highly correlated with both math computation and math problem solving (Thurber, Shinn, & Smolkowski, 2002). Students who are fluent in their retrieval of basic math facts have demonstrated mastery of more advanced math skills across time compared to their peers and greater accuracy when solving problems that require the use of advanced math concepts (Singer-Dudek & Greer, 2005).

In addition to being used for monitoring weekly progress for targeted students, benchmark CBM assessments are administered to all students three times a year to monitor school-wide growth across time and to identify students at risk of academic difficulties. When examining within-year growth, a discrepancy has been noted in recent studies. Ardoin and Christ (2008) found greater within-year growth between the fall-to-winter, but when an effort was made to ensure that the number of weeks between benchmarks was equal, greater within-year growth was found from winter-to-spring (Graney, Missall, Martinez, & Bergstrom, 2009). This difference could also be due to the time of year that the statewide achievement test was administered, as instruction in the classroom is generally intensified in the weeks preceding statewide achievement tests, or the result of intervention efforts (Shin, Deno, & Espin, 2000). Growth rates were found to increase with successive grade levels, a phenomenon that may reflect differences in learning rates across grade levels (Graney, et al., 2009). Performance on curriculum based measures has also been found to be impacted by the novelty of the task. For students who do not typically engage in timed computation tasks, performance on their first benchmark was lower when compared to the performance of students accustomed to completing timed computation tests administered under similar conditions (Christ & Schanding, 2007).

In the area of mathematics, curriculum based measures of early numeracy skills, such as oral counting, number identification, quantity discrimination, and missing numbers with Kindergarten and First Grade students have been found highly predictive of student progress over time (Clarke, Baker, Smolkowski, & Chard, 2008). As students move up in grade level, the relationship between student performance on curriculum-based measures and measures of academic achievement is more established in the area of reading than in mathematics. Measures of oral reading fluency have demonstrated diagnostic accuracy as well as long-term correlation with statewide achievement measures in Florida (Roehrig, Petscher, Nettles, Hudson, & Torgesson, 2008), Minnesota (Hintze & Silberglitt, 2005), and Ohio (Vander Meer, Lentz, & Stollar, 2005). In California, nonsense word fluency measures were found highly predictive of the performance of English language learners on reading portions of the California Achievement Test (Vanderwood, Linklater, & Healy, 2008). Measures of reading and math computation were found predictive of statewide achievement tests in Pennsylvania (Keller & Shapiro, 2005). Benchmarks from the month of January were found to be stronger predictors of performance on the statewide achievement tests than norm-referenced achievement tests, suggesting they are an inexpensive way for schools to screen a large number of students (Shapiro, Keller, Lutz, Santoro, & Hintze, 2006). When investigating the long-term diagnostic accuracy of reading and math curriculum based measures, reading measures were found to be more consistent than math computation measures at predicting performance across two years (Keller-Margulis, Shapiro, & Hintze, 2008). One explanation that has been proposed is the fact that math computation, unlike oral reading fluency, involves mathematical operations that are related but are distinct skills that may or may not be required from one year to the next (Shapiro, et al., 2006). Another possible explanation for this is that math computation is not sufficient for measuring success in elementary school mathematics (Fuchs et al., 1994). Math probes designed for sixth, seventh, and eighth graders that measured basic computation and estimation were found to be more predictive than those that measured basic computation alone (Foegen, 2008b). For this reason, several different systems of probes designed to measure math concepts and applications have been developed. These systems were created using similar procedures. The probes are parallel forms, so they do not become increasingly difficult as the year progresses. Instead, each probe includes word problems that assess skills students are expected to master by the end of the year (Fuchs, Fuchs, & Zumeta, 2008). Traditionally, performance on curriculum based measures of math computation has been evaluated based on a student's raw score. There has been a recent argument for using equated scores yielded through Rasch analysis on measures of math concepts and applications so that the difficulty level of each item is considered when calculating a student's score (Montague, Penfield, Enders, & Huang, 2010). New curriculum based measures designed to assess concepts and applications, such as the AIMSweb Mathematics Concepts and Applications probes, are scored using this approach (Pearson, 2009). Curriculum based measures are now being developed for math courses at the secondary level. A system of math probes to assist with progress monitoring in algebra courses was recently developed (Foegen & Morrison, 2010).

Benefits and Drawbacks of CBM and RTI

CBM has been shown to be an effective method for screening students and measuring response to instruction over time. The benefits of RTI within a school system can be evaluated in several ways. In an effective program, it would be expected that over time there would be fewer students falling in the some risk and at-risk categories. Across benchmarks, the average rate of improvement would be comparable to normative growth rates. For students in the some risk or at risk categories, performance on progress monitoring measures would indicate that students are making progress toward reaching instructional goals and ultimately being placed at a lower tier. Finally, one would expect greater accuracy in referrals to special education, with a higher percentage of students referred for a comprehensive evaluation being found eligible for services (Shapiro & Clemens, 2009). CBM does have several limitations. It has not been shown to be useful in the development of tailored individualized instructional programs, suggesting that additional assessment is necessary for selecting or developing interventions. School administrators have begun to view CBM unfavorably because the fluency skills measured by CBM probes do not appear to correlate with the objectives that make up most standards-based curricula or are assessed as part of state-wide accountability assessment programs (Fuchs & Fuchs, 2007).

There has been some opposition to the adoption of RTI policies at the federal level, and this is largely due to the fact that more evidence needs to be produced to show that such practices systematically result in desired outcomes when used to address academic deficits and as part of the process of identifying students with specific learning disabilities (Kavale, 2003; Reynolds & Shaywitz, 2009b). The problem with waiting to implement RTI is that the only way to determine whether or not it will achieve its promised outcomes is to implement it on a large scale at either the state or national level (Brown-Chidsey & Steege, 2005). There is certainly evidence that early intervention has a huge effect on long-term outcomes for individual students experiencing academic difficulties (Hart & Risley, 1995), and RTI is a set of scientifically based procedures that can be used to make decisions about educational programs (Brown-Chidsey, 2005; Brown-Chidsey, Loughlin, & O'Reilly, 2004). The problem is that the manner in which students are identified as ‘responders’ or ‘nonresponders’ continues to be highly variable, providing no consistent way by which children are identified (Fuchs, Fuchs, & Compton, 2004; Reynolds, 2008; Reynolds & Shaywitz, 2009a). While RTI procedures are generally effective at identifying students of average or below average ability struggling academically, bright students are overlooked by RTI (Reynolds & Shaywitz, 2009b). Many proponents of RTI have argued that children who do not respond to intervention should be considered children with a learning disability and moved to a special education placement without any further diagnostic assessment (Fuchs, et al., 2004; Fuchs & Young, 2006; Reschly, 2005; Shinn, 2005). RTI has the capacity to provide a wealth of information about the child’s academic history and the degree to which he/she benefits from accommodated instruction, but further assessment is necessary to identify processing deficits or a pattern of strengths and weaknesses that are an essential component in determining the presence of a learning disability. A learning disability is a psychopathological condition, and by nature is therefore primarily associated with something within the individual (Reynolds, 2008). Determining that a student has a learning disability without completing a comprehensive evaluation essentially changes the way in which LDs have traditionally been defined, a difficulty that is unexpected based on an individual’s ability. In addition, without a comprehensive evaluation, children with above average intelligence will continue to be ignored, placing them at risk of experiencing academic difficulties that could easily be addressed by implementing accommodations in the classroom (Reynolds & Shaywitz, 2009b). For this reason, RTI should be combined with comprehensive psychological and neuropsychological assessment procedures. This type of model leads to interventions based on assessment (Semrud-Clikeman, Fine, & Harder, 2005). Interventions can then be developed that take advantage of the child's strengths and provide explicit instruction in the information-processing, self-regulation strategies, and the study skills necessary for academic development (Lerew, 2005; Stroud & Reynolds, 2009).

Evidence-Based Interventions That Address Mathematics and Strategy Use

An important component of efforts to reduce the number of students identified as having math disabilities is the prevention of academic difficulties in math in the primary grades. A number of curriculum specialists and textbook authors have answered this call, and a critical feature of several textbooks that are up for or are currently in adoption is a focus on instruction that explicitly teaches procedural and problem solving strategies. These strategies have been shown to enhance students' understanding of mathematics and their ability to think and reason using mathematical terms and concepts (Bryant et al., 2008).

Tier I Interventions

At the Tier I level, researchers have examined interventions and instructional strategies that, when made available to all students, have been shown to enhance performance on measures of math achievement. Kasmer and Kim (2011) found that students in classrooms with teachers who used prediction during the initial stages of a mathematical exploration and problem solving activity outscored students in control classrooms on end of unit assessments. Teachers in the treatment classrooms introduced and modeled to students how to make plausible predictions based on an established generalization, a pattern observed, or a table, graph, or equation. For students experiencing difficulty learning basic math facts or number combinations, two minutes of traditional practice with flashcards, focusing on one fact family for two minutes, following by two minutes of generating number sentences and visual representations on a number line or fact table, were found to increase retention of facts after an average of twenty daily sessions (Fuchs et al., 2010).

Several interventions have been developed to teach mathematics and to improve metacognitive and self-regulation skills. Math instruction that includes training in the use of metacognitive skills led to higher scores on measures of math problem solving. The training was found particularly beneficial to low achievers (Pennequin, Sorel, Nanty, & Fontaine, 2010). Instruction in self-regulated learning strategies administered to third grade students, along with explicit instruction designed to assist with the transfer of problem-solving strategies to a variety of different types of problem-solving situations, was found to positively affect performance on a post-treatment measure of math achievement (Fuchs, et al., 2003). By integrating self-regulation training within the mathematical topics covered within the regular sixth grade math curriculum, students demonstrated higher math achievement scores when compared to students who only received instruction that covered the mathematical topics (Perels, et al., 2009).

A method called IMPROVE, an acronym that stands for Introducing the new concept, Metacognitive questioning, Practicing, Reviewing and reducing difficulties, Obtaining mastery, Verification, and Enrichment, was implemented with seventh graders. Results showed that individuals receiving instruction using IMPROVE showed better developed metacognitive and self-regulation skills and higher scores on measures of mathematics achievement (Mevarech & Kramarski, 1997). Interventions designed to teach self-regulation strategies have been shown to improve math achievement for students at all levels, including students enrolled in advanced math courses, such as algebra and geometry (Allsopp, 1997; Foegen, 2008a; Hutchinson, 1993). In general, acquisition interventions, which are designed to increase the accuracy of student-derived solutions, results in larger effect sizes than fluency interventions, which are designed to increase the speed with which students derive their solutions, although there is some evidence to suggest that interventions targeting both acquisition and fluency might show an even greater effect (Burns, Codding, Boice, & Lukito, 2010).

Tier II Interventions

It is also important that interventions continue to be developed for students who are at-risk of mathematical difficulties and being served at the Tier II level. For students experiencing difficulty learning basic math facts or number combinations, drill and practice of pre-determined fact families, representing those facts using a number line or fact chart, and using blocks to emphasize decomposition or break down each fact was found to increase retention after an average of twenty ten minute sessions (Fuchs, et al., 2010). An intervention designed to teach cognitive strategy use to first graders at risk for math difficulties was administered to students for twenty-minute sessions four days per week across twenty-three weeks. Results showed a significant intervention effect on a measure of math fluency used for the purpose of progress monitoring. In addition, students receiving the intervention demonstrated significant improvement on measures of number sense, magnitude comparison (the ability to differentiate the smaller or larger of two numbers), number sequences (the ability to identify a missing number in a sequence or pattern), place value, and addition and subtraction combinations using sums and minuends ranging from zero to eighteen (Bryant et al., 2008). An intervention for students in third grade designed to teach strategies for solving math word problems using equal sign instruction improved problem solving ability by teaching students how to solve nonstandard equations, such as ___ + 4 = 6 + 7 (Powell & Fuchs, 2010). Finally, recent literature has shown some promise in the use of solution-focused brief counseling for increasing math assignment completion for students whose problems in mathematics are due to a performance deficit (Fearrington, McCallum, & Skinner, 2011). One issue that continues to be a problem as students are considered for services at the Tier II level is that there are few informal assessments that have been shown useful in identifying students who possess the deficits that a particular intervention are designed to address. This is especially true for self-regulation and learning strategies. For this reason, students are often selected for an intervention based on teacher reports rather than being identified using systematic measures or procedures that are applied consistently to all students.

Tier III Interventions

Intensive interventions are also essential at the Tier III level, usually the level at which students are placed in special education. For students who continue to struggle with retaining basic math facts and number combinations, daily drill and practice using flash cards for ten minutes, representing each math fact using a number line or fact chart, decomposing or breaking down each fact using manipulatives, daily practice using a computerized instructional program, and ten minute drill and practice sessions at home with a caregiver were found to help maintain retention of basic math facts. Retention of facts were found to show significant decay after a one week lapse in daily drill and practice (Fuchs, et al., 2010). A self-regulation strategy was taught to a group of fifth- and sixth-grade students with learning disabilities to assist with comprehending word problems, selecting the appropriate operation, and devising the correct solution. Students receiving the intervention improved their performance on mixed sets of addition and subtraction word problems (Case, et al., 1992). A group of junior high school students with learning disabilities who received cognitive and metacognitive strategy instruction demonstrated more accuracy when solving mathematical word problems. In addition, the amount of time they were able to successfully participate in a general education mathematics program increased, the students reported feeling more confident about their mathematics ability, and their self esteem and motivation to solve mathematical word problems were positively influenced (Montague, et al., 1993). Strategy knowledge was found to have a positive influence on both verbal and visual-spatial working memory in children with learning disabilities, allowing the students to have more cognitive resources available to use for storing and processing information pertinent to the problem solving situation (Keeler & Swanson, 2001).

Seven Principles for Selecting and Developing Interventions

Researchers have identified seven principles for effective practice to guide intervention development and strategy instruction. First, the best interventions operate on the law of parsimony, focusing on a few critical strategies and teaching them well (Montague, 2008). Second, interventions designed to provide cognitive strategy instruction must be disseminated to teachers charged with carrying out the instruction in such a way that maximizes fidelity of implementation. Teacher lesson plans should be explicit in the scope and sequence of each lesson and all of the necessary aids and materials should be conveniently packaged in a teacher- and student-friendly format (Montague & Dietz, 2009). Third, strategies that are taught and mastered in one type of math problem solving situation will not automatically transfer to other situations. Therefore, instruction must include procedures that promote generalization (Montague, 2008; Swanson, 1999).

Fourth, effective strategy use will not necessarily eliminate the processing deficits in students. Instead, they will provide students with a mechanism for coping or overcoming these deficits which will lead to improved academic outcomes in the area of mathematics (Hutchinson, 1993; Montague, 1992). Fifth, effective strategy use and documentation that a student has responded appropriately to an intervention will not eliminate performance differences. While the student may continue to underperform compared to their nondisabled counterparts, they will demonstrate a reasonable benefit from the academic instruction being offered within the general education setting as a result of the additional supports and services (Montague, 2008). Sixth, an intervention should be developed with the student's current knowledge base and capacity in mind (Fuchs et al., 2008). Finally, monitoring student progress using appropriate measures is an essential component of intensive intervention. Different models of measurement exist and different models answer different questions about a student's response. The use of appropriate measures is essential as different measures can lead to different children being identified as disabled. Appropriate measures allow decisions to be made in the educational programming of students experiencing academic difficulties that are based on data, not just the perceptions or preferences of the individuals who convene to develop or select an intervention plan (Fuchs & Fuchs, 2007; Reynolds, 2009). Progress monitoring also allows for adjustments to be made to instruction as early as possible when it becomes clear that the intervention plan is not producing its desired effect (Fuchs, Fuchs, Powell, et al., 2008).

Areas Needing Further Research

There continues to be a need for assessment tools and conceptual models for identifying and placing students in intervention programs designed to address deficits in mathematics as well as learning and self-regulatory strategy use. Most researchers studying strategy use design their own measure because few valid measures have been developed to measure learning strategy use, and of those instruments that are currently available, there is little or no evidence to support their use in identifying students experiencing deficits in strategy use and learning difficulties in the area of mathematics (Boekaerts & Corno, 2005; Montague & Dietz, 2009). There is a need for standardized assessments that are easy to use, readily available, and designed to measure the acquisition and use of cognitive and learning strategies, particularly those designed to enhance self-regulation (Wu et al., 2008). There is also a need for continued investigation of the use of curriculum-based measures for identifying students at-risk of academic problems in mathematics. In addition, researchers need to delineate those interventions designed to provide strategy instruction that are appropriate for use in a Response to Intervention model and at what tier these interventions should be implemented. It is possible that some of the interventions that have been developed and have been shown to be effective at one level (whole-class instruction) may be modified and administered at the appropriate level of intensity for use with students at a different tier (Fuchs & Deshler, 2007).

Statement of the Problem

Review of the extensive literature on self-regulation and learning strategies indicates that the best programs for addressing deficits in strategy use as they relate to academic performance in mathematics provide explicit instruction teaching students how to use these strategies within the context of the general math curriculum. For students who continue to experience difficulties in mathematics, school personnel need reliable and valid measures to assist them in identifying students with deficits in self-regulation, learning, and study strategies and in tailoring interventions to the specific strategies that need to be addressed for the student to demonstrate progress in the general curriculum. One measure that has been available since 2006, the School Motivation and Learning Strategies Inventory (SMALSI) (Stroud & Reynolds, 2006), is a self-report inventory for use with children ages eight through eighteen designed to assist educators in identifying and measuring the strategies students actively use for learning. The SMALSI has been reviewed and been found to have solid psychometric properties (Jeary, 2007). It focuses on academic motivation and strategy use, two areas that are often overlooked in psychoeducational assessment, and may have practical links to the selection and design of intervention.

The primary objective of this study was to evaluate the effectiveness of the SMALSI in the universal screening of students enrolled in grades three through five to identify students with poor or inadequate learning and study strategies. Related to this objective, the effectiveness of the SMALSI in monitoring progress of students receiving Tier II and Tier III interventions designed to address deficits in learning and self-regulation strategies was also evaluated. To do this, a link between scores on the SMALSI and math achievement must first be identified. Scores on the Study Strategies, Note-Taking/Listening Skills, Time Management/Organizational Techniques, and Test-Taking Strategies scales were used as predictors of math achievement, as measured by the four math clusters of the Woodcock-Johnson III Tests of Achievement (WJ-III). Scores on the Reading/Comprehension Strategies and Writing/Research Skills scales and their relationship with math achievement were also evaluated, even though the research linking reading and writing to mathematics is not as solid as research demonstrating a link between math and self-regulation and learning strategy use. The scores on scales measuring liabilities, including Low Academic Motivation, Test Anxiety, and Attention/Concentration Difficulties, were evaluated to see if they have a negative impact on math achievement. An additional area of interest was the relationship between scores on curriculum-based measurement probes and math achievement scores. The math computation and math concepts and applications probes came from AIMSweb, a program available to assist school districts with the implementation of CBM and progress monitoring. Math achievement was measured using the four math clusters of the

WJ-III and scores on the math portion of the Texas Assessment of Knowledge Skills, the statewide assessment program which all public schools in Texas are required to participate. Finally, differences in the relationship between scores on the SMALSI scales across the three grade levels, as well as gender, were investigated. The following are the research questions that guided this study.

1.) What is the relationship between scores on the Study Strategies, Note-Taking/ Listening Skills, Test Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the math cluster scores of the WJ-III?
2.) What is the relationship between scores on the Reading/Comprehension Strategies and Writing/Research Skills scales and the math cluster scores of the WJ-III?
3.) What is the relationship between scores on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales and the math cluster scores of the WJ-III?
4.) Can school motivation and learning and study strategies as measured by scores on the nine scales of the SMALSI Child Form be used to predict math achievement as measured by the math cluster scores of the WJ-III?
5.) What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a norm-referenced measure of math achievement, such as the WJ-III?
6.) What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a criterion-referenced measure of math achievement, such as the math portion of the Texas Assessment of Knowledge and Skills?

7.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI across the three grade levels?

8.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI based on gender?

9.) Is there an interaction effect on level of school motivation and learning and study strategies being reported by students on the SMALSI based on grade level and gender?

The researcher predicted that there would be a statistically significant relationship between the Study Strategies, Note-Taking/Listening Skills, Organizational Techniques, and Time Management scales of the SMALSI and the four math clusters of the WJ-III. There would be a statistically significant relationship between the Reading/ Comprehension Strategies and Writing/Research Skills scales and the four math clusters of the WJ-III. There would be a statistically significant relationship between the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the four math clusters of the WJ-III. There would be statistically significant relationship between the AIMSweb Math Computation and AIMSweb Concepts and Applications probes and both measures of math achievement (WJ-III math clusters and the math portion of the TAKS). The level of school motivation and learning strategies reported on the SMALSI is expected to differ across the three grade levels, with higher levels being detected in fifth grade than in third grade. The level of school motivation and learning strategies reported on the SMALSI is expected to differ across gender, with females scoring higher on the scales of the SMALSI measuring academic strengths and test anxiety and males scoring higher on the scales of the SMALSI measuring low academic motivation and concentration and attention difficulties

CHAPTER III

METHOD

This chapter describes the methods used to conduct and analyze the study and the instruments to collect the information about the participants. The chapter is divided into the following sections: (a) context of the study, (b) a description of the participants, (c) a description of the instruments and measures used in the study, and (d) an explanation of the design, procedure, and data analysis based on each question posed in the previous chapter. The primary purpose of this study was to examine the relationship between learning strategies and study skills on academic achievement in mathematics.

Context

Data for this study was collected in the Galena Park Independent School District, which is located in the state of Texas in east Harris County. The Galena Park Independent School District was established in 1930 and serves the city of Galena Park, about half of the city of Jacinto City, small portions of the city of Houston (the Fidelity and Northshore areas) and unincorporated areas of Harris county (Channelview and Cloverleaf census designated places). It is currently designated by the Texas Education Agency as having a Recognized Accountability Rating. This rating is the second highest in a system of four possible ratings (Exemplary, Recognized, Academically Acceptable, Academically Unacceptable) and is determined in large part based on the percentage of students in the district passing all sections of the Texas Assessment of Knowledge and Skills (TAKS) test, with 65% or higher being the standard criterion (Texas Education Agency, 2008). The district serves approximately 22,000 students, with the majority of students identifying as Hispanic. The number of students identifying as

Hispanic that are served in the District is higher than that of the city of Houston and the state of Texas. This demographic information is presented in Table 1.

Table 1
Demographic Information by Ethnicity

Ethnicity	**Galena Park ISD**	**Houston**	**Texas**
African American	20.8%	24.3%	14.4%
Hispanic	70.1%	37.4%	46.3%
White	7.7%	30.8%	35.7%
Native American	0.1%	0.4%	0.3%
Asian/Pacific Islander	1.3%	5.4%	3.3%

The Texas Education Agency monitors three additional subgroups of students. First, students are identified as Economically Disadvantaged if they are eligible for free or reduced lunch or other types of public assistance. Second, students are identified as limited English proficient (LEP) by the Language Proficient Assessment Committee (LPAC), a committee comprised of educators from the Local Education Agency (LEA), with this designation being determined largely on the basis of the Home Language Survey completed by the child's parent. Students identified as LEP usually receive bilingual or English as a second language instruction, but this is not always the case. Finally, students are identified as At Risk if they meet at least one of thirteen different criteria. The majority of students in Galena Park ISD are identified as At-Risk due to one or more of the following: designation as a student who is limited English proficient, not meeting the minimum standard on one or more sections of the statewide assessment program for the current or previous school year, or not advancing from one grade level to another in one or more school years. For students in prekindergarten, kindergarten, and grades one through three, a designation of At-Risk can be given if the student does not perform satisfactorily on a readiness test or other standardized assessment instrument administered during the current school year (Texas Education Agency, 2007). Compared to the current statistics for the state of Texas, Galena Park ISD has a large percentage of students who meet criteria for these three subgroups. This demographic information is presented in Table 2.

Table 2
Demographic Information by Subgroup

Group	**Galena Park ISD**	**Texas**
Economically Disadvantaged	74.3%	55.5%
Limited English Proficient	27.5%	16.0%
At-Risk	58.3%	48.3%

Because of the number of risk factors that affect students being served by the District, the District has implemented a number of programs over the past ten years to reduce retention rates, increase graduation rates, reduce the number of students being identified and served in special education, and reduce the number of students being served in disciplinary placements. In 2000, the district implemented a model for serving special education students receiving services to address behavioral difficulties in which a continuum of services are available, based on the needs of the individual student, and range from full inclusion in general education with self-monitoring to placement in a residential treatment facility. At the same time, the District began to focus on classwide and schoolwide programs intended to prevent problem behaviors and to promote student engagement in the learning process.

In 2002, the district implemented a three-tiered model for assisting students experiencing behavioral difficulties. When a behavioral concern becomes evident, the classroom teacher for the child requests assistance at the campus level through the Student Assistance Team. Other grade level teachers and the campus behavioral specialist work with the classroom teacher and the child's parent to develop accommodations and other supports and services that are implemented in the classroom by the classroom teacher with the support of a campus paraprofessional and with parental collaboration. If the child continues to experience behavioral difficulties, the campus behavioral specialist becomes more involved and if necessary, the child receives specialized instruction outside of the classroom but still within the general education setting, usually for no more than forty-five minutes per week. For those students who continue to demonstrate behavioral difficulties, behavioral specialists at the district level are contacted and a third meeting with the Student Assistance Team is held. A plan is developed and implemented involving more intensive services, usually provided in collaboration with the campus behavioral specialist and a district behavioral specialist with specialized training and experience. This system resulted in a significant decrease in the number of students referred for special education services and the number of general education students served in disciplinary placements.

To improve the services in place to address academic difficulties, a similar three-tier model was implemented for addressing academic problems in 2004. This model required the District to make some significant adjustments. District and campus instructional specialists received an extensive amount of training on evidenced-based academic interventions, the use of curriculum-based measurement, and data-based decision making. The roles and responsibilities for a number of district personnel, including campus and district instructional specialists, educational diagnosticians, and licensed specialists in school psychology were revised to promote more collaboration in implementing interventions and monitoring student progress. While the District had to remain committed to addressing the needs of all students experiencing academic difficulties, a particular emphasis was placed on screening and monitoring students in the early grades so that academic problems could be identified and addressed when they first become apparent, while they are still straightforward and relatively easy to address. Finally, the district had to change how resources were distributed and made available to both district and campus personnel.

After five years, the District has seen positive results. The District has moved from an Academically Acceptable designation by the Texas Education Agency to being Recognized. The District has seen an increase in the number of campuses receiving Exemplary and Recognized ratings. Finally, positive outcomes for the students should not be overlooked. The number of students who are meeting the minimum standard on statewide assessments has increased while the number of students who are retained or referred for special education has decreased. The District has also seen an increase in the number of students who are graduating from high school under the Recommended High School Program, the program that is required of students applying for admission to a four-year college or university.

The District continues to take steps to improve this model. Several areas are currently being targeted for improvement, including mathematics. Assessment specialists in the District are working to develop more effective ways of identifying students needing services at all levels. Behavioral and learning specialists search for evidence-based interventions and ways to tailor them to address the academic and non-academics needs of students in the District. The research questions and outcomes of this study helped the District in carrying out these initiatives and have had a positive benefit for the students participating in the study, their parents, and the teachers who serve them.

Participants

The researcher received confirmation from the principal of Williamson Elementary School, the elementary campus that agreed to participate in the study. The campus had been rated Exemplary by the Texas Education Agency for the past three school years. During the 2009-2010 school year, Williamson Elementary School had ninety-eight third graders, seventy-six fourth graders, and sixty-nine fifth graders. The demographics across the three grades were 144 African American (59.6%), 67 Hispanic (27.4%), 19 White (7.6%), and 13 Asian/Pacific Islander (5.4%). For the three subcategories, 151 students were identified as Economically Disadvantaged (62.3%), 32 were Limited English Proficient (13.2%), and 104 were identified as At Risk (42.7%). Twenty-three (9.3%) of the students were enrolled in special education. One student was being served off-campus in a disciplinary placement. Third through fifth graders were selected to participate in this study because students at these grade levels are starting to develop and apply learning strategies and study skills. For this reason, these would be the optimal grade levels for early identification and intervention to take place.

A priori power analyses were conducted based on the effect sizes reported in previous studies investigating similar constructs (Boekaerts & Corno, 2005; Fuchs, et al., 2003; Mevarech & Kramarski, 1997; Montague, 2008; Montague & Dietz, 2009; Perels, et al., 2009; Wu, et al., 2008). Power analysis allows the researcher to calculate the minimum sample size required in order to accept the outcome of a statistic and reject the null hypothesis with confidence (Cohen, 1988). Using the eta squared values from these studies and conducting a what-if test (Thompson, 2006), the sample for this study was found to need a minimum of thirty-seven students in each grade level in order to have adequate power. The results of these what-if tests were interpreted with caution because, while all of these studies investigated similar constructs and used similar measures, the constructs and measures used in this study had not been investigated in previous studies. Although all students in grades three through five were eligible for the study, only those with a signed consent form were included.

Consent forms were sent home with all 243 students in grades three through five. Initial interest in the study was disproportionately higher among students in the fourth grade. For those students in third and fifth grade who did not return a signed consent form within two weeks, a second consent form was sent home in an effort to attract an equal number of participants in the three grade levels. This resulted in a significant increase in third grade participants but only a slight increase in participants in the fifth grade. Of the 243 students, 176 returned signed consent forms to their classroom teacher for a 72.4% response rate. Sixty third grade students (34.1%), sixty-eight fourth grade students (38.6%), and forty-eight fifth grade students (27.3%) were part of the full sample. Fourth grade had the highest response rate (89.5%), followed by third grade (61.2%), and then fifth grade (69.6%). Characteristics of the full sample are summarized in Tables 3 through 19. Participants ranged in age from eight to eleven, with a mean age of 9.608 (*SD* = 1.020). There were almost an equal number of males and females in the sample. Ninety-two of the participants (52.3%) identified as being African American. Approximately 71 percent (n = 125) were classified by the District as economically disadvantaged. The majority of students in the sample had not been retained in a previous grade level, and parents reported that they had not experienced any academic problems. Of those who had experienced academic problems, school records confirmed that the majority were receiving interventions through general education programs. Of those receiving special education services, the majority of them had been identified eligible for services as a student with a Specific Learning Disability in reading. On the Home Language Survey, the parents of the majority of participants reported English as their primary language. Of those who reported a language other than English as their primary language, the majority of them identified Spanish as their primary language.

Table 3
Age

Age	n	Percent
8	26	14.6
9	58	33
10	54	30.7
11	35	21.6

Table 4
Gender

Gender	n	Percent
Female	89	50.6
Male	87	49.4

Table 5
Ethnicity

Ethnicity	n	Percent
African American	92	52.3
Hispanic	57	32.4
Caucasian	16	9.1
Asian/Pacific Islander	11	6.2

Table 6
Socioeconomic Status

Economically Disadvantaged	**n**	**Percent**
Yes	125	71.1
No	51	28.9

Table 7
Grade Retention

Previously Retained	**n**	**Percent**
Yes	11	6.2
No	165	93.8

Table 8
Academic Problems

Experienced Academic Problems	**n**	**Percent**
Yes	71	40.3
No	104	59.1

Table 9
Academic Problems Resolved

Academic Problems Have Been Resolved	**n**	**Percent**
Yes	22	12.5
No	50	28.4
Not Applicable	104	59.1

Table 10
Special Education

Receiving Special Education Services	**n**	**Percent**
Yes	17	9.7
No	156	88.6

Table 11
Disability Category

Disability Category	**n**	**Percent**
Specific Learning Disability	12	6.8
Autism	4	2.3
Emotional Disturbance	1	0.6
Mental Retardation	1	0.6
Not Applicable	157	89.1

Table 12
Response to Intervention

Level of Services	**n**	**Percent**
Tier I	18	10.2
Tier II	18	10.2
Tier III	13	7.4
Intervention has ended, Progress monitoring continues	13	7.4
Intervention ended, Student has been dismissed	8	4.5
Student has never been served	106	60.2

Table 13
Language Other Than English Spoken In Home

Status	n	Percent
Yes	52	29.5
No	124	70.5

Table 14
Primary Home Language

Language	n	Percent
English	155	88.1
Spanish	19	10.8
Vietnamese	1	0.6
Cambodian	1	0.6

Table 15
Language Spoken In Home

Language	n	Percent
English	124	70.5
Spanish	41	23.3
Vietnamese	3	1.7
Filipino	2	1.1
Urdu	1	0.6

Table 16
Assessed by LPAC

Status	n	Percent
Yes	47	26.7
No	129	73.3

Table 17
Identified As English Language Learner

Status	n	Percent
Yes	21	11.9
No	155	88.1

Table 18
Gifted and Talented

Status	n	Percent
Yes	22	12.5
No	154	87.5

Table 19
Passed 2010 TAKS Math Test

Status	n	Percent
Yes	154	87.5
No	22	12.5

Instruments and Measures

Students' level of use of study strategies, note-taking and listening skills, organizational techniques and time management, test taking strategies, reading and comprehension strategies, writing and research skills, academic motivation, test anxiety, concentration and attention, math calculation skills, math reasoning, math fluency, math concepts and applications, and general math achievement were measured using the following instruments: the School Motivation and Learning Strategies Inventory (SMALSI), the math clusters and subtests from the Woodcock-Johnson III Tests of Achievement (WJ-III), Math Computation (M-CBM) and Math Concepts and Applications (M-CAP) Winter Benchmarks from the AIMSweb Progress Monitoring

System, and the Texas Assessment of Knowledge and Skills (TAKS). Their characteristics are described next.

School Motivation and Learning Strategies Inventory

The students' level of study strategies, note-taking and listening skills, organizational techniques and time management, test taking strategies, reading and comprehension strategies, writing and research skills, academic motivation, test anxiety, and concentration and attention were obtained using the School Motivation and Learning Strategies Inventory (SMALSI) Child Form. The SMALSI is designed to measure ten constructs associated with academic motivation and learning strategies. Seven of the constructs focus on student strengths and three focus on student liabilities. The seven student strengths are study strategies, note taking and listening skills, reading and comprehension strategies, writing and research skills, test-taking strategies, and time management and organizational techniques. The three student liabilities are low academic motivation, test anxiety, and concentration and attention difficulties. Scores for the 10 scales are reported as T-scores (M = 50, SD = 10). For the student strengths, higher scores indicate that the skill being measured is better developed. For the student liabilities, a higher score indicates that the construct being measured is a significant problem for the student and may adversely impact academic performance. A validity measure for detecting inconsistent responding is also provided. The SMALSI-Child Form is for students ages eight through twelve and contains 147 items. Students respond to each item on the SMALSI using the answer choices Never, Sometimes, Often, or Always. The SMALSI scales have reported internal consistency reliabilities ranging from 0.69 to 0.81 (Stroud & Reynolds, 2006). Scores for the SMALSI were calculated using the software scoring program provided by the publisher.

Woodcock-Johnson III Tests of Achievement

The students' math calculation skills, math reasoning, and general math achievement were obtained using the Woodcock-Johnson III Tests of Achievement (WJ-III). The WJ-III contains twenty-two tests measuring five areas: reading, mathematics, written language, oral language, and academic knowledge (Mather & Woodcock, 2001). Students were administered the four subtests measuring mathematics (Calculation, Math Fluency, Applied Problems, Quantitative Concepts). The Calculation subtest requires the examiner to perform various mathematical calculations and retrieve math facts. The Math Fluency subtest requires the examiner to add, subtract, and multiply basic facts rapidly. The Applied Problems subtest requires the individual to perform math calculations in response to orally presented word problems. The Quantitative Concepts subtest requires the individual to identify math terms and formulae and identify number patterns. The Calculation, Math Fluency, and Applied Problems subtests are combined to form the Broad Math cluster, and the Calculation and Applied Problems subtests are combined to form the Brief Math cluster. The Calculation and Math Fluency subtests are combined to form the Math Calculation Skills cluster, and the Applied Problems and Quantitative Concepts subtests are combined to form the Math Reasoning cluster. The Broad Math cluster is a measure of general math achievement. The Brief Math cluster is meant to serve as a screening measure of math achievement. The Math Calculation Skills cluster measures computation skills and automaticity with math facts. The Math Reasoning cluster measures problem solving, concepts, and math vocabulary. Scores for the four subtests and four clusters are reported as standard scores (M = 100, SD = 15). Standard scores for each subtest and for the two clusters were calculated using the Compuscore and Profiles Program, an automated scoring system provided by the publisher. Reliability coefficients range from 0.81 to 0.94 for the individual subtests and the four math clusters have coefficients above 0.90 (Mather & Woodcock, 2001).

AIMSweb Progress Monitoring System

AIMSweb is a progress monitoring system based on direct, frequent, and continuous student assessment. Results are reported via a web-based data management and reporting system. AIMSweb provides Math Computation (M-CBM) probes that include computational problems based on expected computational skills for students in grades one through six with forty alternative forms for progress monitoring as well as three benchmark assessments. The benchmark assessments are given in the fall (August/September), winter (December/January), and the spring (May) and designed for universal screening to identify students at-risk for difficulties in mathematics. Each probe has two pages of computational problems printed front and back arrayed in rows. Students write their answers to these computational problems under standardized conditions and time frames that are dependent on the students' grade. Math Computation probes are administered for two to four minutes depending on the grade level of the assessment materials, and students are asked to complete as many problems as they can (Pearson, 2008). Correlation among parallel forms of the Math Computation probes are generally high, ranging from 0.90 to 0.92, suggesting high alternate forms reliability. Interrater agreement has been found to range from 0.77 to 0.94, suggesting that training personnel on the standardized administration and scoring procedures of the Math Computation probes is a critical step prior to administration (Thurber, et al., 2002). Scores for the Math Computation probes are based on the number of correct digits. When these scores are entered into the on-line tracking system, a percentile rank is calculated and can be based on local, state, or national norms. The Math Computation Winter Benchmark was initially scored by hand for determining the number of correct digits. Percentile ranks based on local norms were obtained from the on-line tracking system. Because percentile ranks are ordinally scaled, they were converted to intervally scaled scores using the Normal Curve Equivalent so that they could be compared to the scores from other measures included in this study, which all have intervally scaled scores. Normal Curve Equivalent scores have a mean of 50 (*SD* = 21.06).

The AIMSweb Mathematics Concepts and Applications (M-CAP) are a new addition to the AIMSweb system. They are a series of tests of short duration that measure the general problem solving skills in mathematics that are expected of students in grades two through eight. The tests can be administered in a group setting or to individual students. Administration time is eight to ten minutes, depending on the grade level being assessed (Pearson, 2009). Domains assessed on the Math Concepts and Applications probes are consistent with the content areas recommended by the National Council of Teachers of Mathematics and include number sense, operations, patterns and relationships, data and probability, measurement, data and statistics, geometry, and algebra (National Council of Teachers of Mathematics, 2006; Pearson, 2009). For each grade level, there are thirty-three equivalent probes that can be used for progress monitoring as well as three benchmark assessments. Reliability coefficients for the Math Concepts and Applications probes range from 0.80 to 0.87. During the test administration, students are given a test booklet and an answer sheet. In order for an item to be scored correctly, the student must have written an answer for the item on the answer sheet and the entire answer must be correct. Test items are worth 1, 2, or 3 points, depending on the difficulty level of the item. Easy items are worth 1 point, moderate items are worth 2 points, and difficult items are worth 3 points. Scores for the Math Concepts and Applications probes are based on the total number of points a student earned for items completed and answered on the answer sheet. When these scores are entered into the on-line tracking system, a percentile rank is calculated based on local norms. The Math Concepts and Applications Winter Benchmarks were initially scored by hand for determining the total number of points. Percentile ranks based on local norms were obtained from the on-line tracking system. The percentile ranks were converted to Normal Curve Equivalent scores before being analyzed.

Texas Assessment of Knowledge and Skills

The Texas Assessment of Knowledge and Skills (TAKS) is a statewide assessment program developed by Pearson Educational Measurement and overseen by the Student Assessment Division of the Texas Education Agency. Participation in the statewide assessment program is required of all public schools in Texas. The TAKS math test was developed for grades three through eleven and designed to reflect good instructional practice, accurately measure student learning, and ask questions that measure student learning in authentic ways. The versions of the TAKS math test developed for grades three through five are based on the six objectives that form the foundation for the Texas Essential Knowledge and Skills (TEKS) written for all of the elementary grades (Texas Education Agency, 2008). These six objectives are reprinted below.

> Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning (Texas Education Agency, 2008, p. 13).
>
> Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning (Texas Education Agency, 2008, p. 17).
>
> Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning (Texas Education Agency, 2008, p. 20).

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement (Texas Education Agency, 2008, p. 24).

Objective 5: The student will demonstrate an understanding of probability and statistics (Texas Education Agency, 2008, p. 29).

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving (Texas Education Agency, 2008, p. 33).

The majority of the items on the TAKS math test are presented in a multiple choice format with four possible answer choices. There are a few questions that are presented in an open-ended griddable item format. For these items, a four column grid is provided for students to record and bubble in their answers (Texas Education Agency, 2008). Raw scores for the TAKS math test are transformed into standard scores using the Rasch Partial-Credit Model. Reliability coefficients for the TAKS math test range from 0.68 to 0.89 (Texas Education Agency, 2007).

Starting with the Spring 2010 administration of the TAKS test, scores were reported as scaled scores that ranged from 200 to 800. The passing standard was different for each grade level. This was to take into account the learning rate of students at different grade levels and to allow parents and school districts to be able to measure academic growth across school years. The passing standard for the TAKS Third Grade Math Test was a scaled score of 483 or higher and commended performance was designated for students achieving a scaled score of 659 or higher. The passing standard for the TAKS Fourth Grade Math Test was a scaled score of 554 or higher and commended performance was designated for students achieving a scaled score of 725 or higher. The passing standard for the TAKS Fifth Grade Math Test was a scaled score of 620 or higher and commended performance was designated for students achieving a scaled score of 763 or higher (Agency, 2010a). For the Spring 2010 administration, the Third Grade TAKS

Math Test had a statewide mean of 587.86 (*SD* = 97.55), the Fourth Grade TAKS Math Test had a statewide mean of 655.17 (*SD* = 101.31), and the Fifth Grade TAKS Math Test had a statewide mean of 694.78 (*SD* = 98.83) (Texas Education Agency, 2010b). The scores used in this study were the scores students achieved during the April 2010 administration of the TAKS Math Test. Students who were absent on the day of the April 2010 administration and those in the Fifth Grade who achieved a failing score for the April 2010 administration were given two additional chances to take and pass the test, but different versions of the test were used for these later administration dates. For this reason, scores from the later administration dates were excluded from the study.

Design

A quasi-experimental cross-sectional study design was used to examine the relationships between students' use of study strategies, note-taking and listening skills, test taking strategies, organizational techniques and time management, reading and comprehension strategies, writing and research skills, academic motivation, test anxiety, and concentration and attention and the students' academic achievement in the areas of broad math achievement, brief math achievement, math calculation skills, math reasoning, math fluency, math problem solving, and mastery of the Texas Essential Knowledge and Skills in mathematics. A quasi-experimental design is used when the researcher is unable to randomly assign participants to the groups of interest. A cross-sectional design is used in developmental research and allows a researcher to analyze differences that exist in children who belong to different age cohorts at the same point in time (McBurney & White, 2007). Self-report information on the use of study strategies, note-taking and listening skills, organizational techniques and time management, test taking strategies, reading and comprehension strategies, writing and research skills, academic motivation, test anxiety, and concentration and attention was obtained from participants in March 2010. At the same time, standardized norm-referenced measures of broad math achievement, brief math achievement, math calculation skills, and math reasoning were administered to participants by trained undergraduate research assistants. A benchmark measure of math fluency and math problem solving was administered by the District in January 2010 and was analyzed in this study. A standardized criterion-referenced measure of mastery of the Texas Essential Knowledge and Skills in mathematics was administered in April 2010 and was analyzed in this study. While this type of design has certain limitations, such as no random assignment, it was the best available design given the fact that this was a field-based study and the groups (gender, grade levels) were naturally occurring. In addition, the dates that three of the measures were administered, the measures of math fluency and math problem solving and the standardized criterion-referenced measure had already been set and were beyond the control of the researcher.

Analysis

The data was analyzed using the Statistics Program for the Social Sciences for Windows (SPSS Version 16.0, 2007). The statistical procedures used were (a) the Pearson product-moment correlation coefficient, (b) one-way analysis of variance (ANOVA), (c) two-way factorial ANOVA (d) linear regression analysis, and (e) multiple regression analysis. The alpha level used for the one way ANOVA, two-way factorial ANOVA, and multiple regression was 0.05. For the Pearson product-moment correlation coefficient and linear regression, the alpha level used was 0.01. The Pearson product-moment correlation, linear regression, and multiple regression statistical procedures were used because the independent and dependent variables were continuous data measured using an interval scale. The one-way ANOVA was used for analyses involving a single nominal grouping variable and one variable measured using an interval scale. The two-way factorial ANOVA was used for analyses involving two nominal grouping variables and one variable measured using an interval scale (Thompson, 2006). The 95% confidence interval for all sample means, Pearson correlation coefficients, a (Constant) variables, unstandardized B values, and standardized Beta weights were calculated and reported. A confidence interval provides a range of scores for which there is a ninety-five percent probability that the statistics obtained from another sample with the same number of participants and same standard deviation would be a value somewhere between the lower and upper limits of the confidence interval (Kline, 2004; Thompson, 2006). Reliability analyses were conducted on the scores obtained for all measures. Values for Cronbach's coefficient alpha were reported for the scores obtained on the SMALSI, WJ-III, AIMSweb Math Computation Winter Benchmarks, AIMSweb Math Concepts and Applications Winter Benchmarks, and the TAKS Math Test (Thompson, 2003).

The Pearson product-moment correlation, also referred to as Pearson *r*, is a statistic on an ordinal scale with a minimum limit of -1.0 and maximum limit of +1.0 that measures the strength and direction of the linear relationship between two variables. When the linear relationship is positive, scores for both variables move in the same direction, so that as the score on one variable goes up the score on the other variable goes up. The converse is also true, so that as the score on one variable gets smaller the score on the other variable also tends to get smaller. When the linear relationship is negative, the two variables have an inverse relationship, meaning that as one variable becomes larger the other variable becomes smaller.

When calculating the Pearson *r*, one variable is referred to as the predictor variable and the other variable is referred to as the criterion variable. The predictor variable, usually referred to as variable X, is used to predict the criterion variable, referred to as variable Y. The Pearson *r* can be used to construct a line of best fit, which depicts the degree to which a participant's obtained score on variable X predicts their score on variable Y. The Pearson *r* can also be used to calculate R^2, also called the coefficient of determination or the common variance, which is a standardized score that measures the amount of variance that exists in variable Y that is accounted for or explained by variable X (Thompson, 2006).

An extension of Pearson *r* is linear regression. Linear regression is a procedure that uses the Pearson correlation coefficient to predict scores for Y based on scores obtained for X using the equation $Y = Bx + a$, where *B* and *a* are fixed constants. The constant *B* represents the slope of the line and *a* is an additive constant. For each value of X, this equation gives the best prediction of Y. It can be used to find the best fitting straight line for a set of data called the regression line. The values for predicted Y are not expected to equal the obtained Y values. This would only happen in a situation where the dependent and independent variable were perfectly correlated; but the stronger the correlation between the variables, the more the predicted Y values will approximate the obtained Y values. The predicted Y values represent all of the variability within the predictor variable that is useful in predicting Y because any non-predictive variability has been removed (Gravetter & Wallnau, 2008; Thompson, 2006). In regression analysis, values for X are transformed into standardized scores, or z-scores, and this causes the values for the constants *a* and *B* to become standardized. The value for *a* becomes zero, shortening the regression equation, but the *B* values continue to be important. Standardized values of *B* are called Beta weights, represented using the Greek letter β. In linear regression, the Beta weight is equal to the value for the Pearson *r* correlation coefficient.

Analysis of Variance (ANOVA) is a statistical technique used to compare the means of two or more groups on a single outcome variable that is intervally-scaled. The design for the current study was unbalanced, since the number of participants in each grade level was not equal. Three assumptions must be met when using Analysis of Variance. These assumptions are: (a) random and independent samples, (b) normal distribution of the dependent variable, and (c) homogeneity of variance of the dependent variable (Gravetter & Wallnau, 2008). The dependent variables, the raw scores on the SMALSI, were tested to determine if they met these assumptions. Histograms were used as a visual test for normality, and Levene's test was used to confirm homogeneity of variance.

Multiple regression analysis is a statistical technique that allows the relationship between a single criterion variable and two or more predictor variables to be investigated. When using multiple regression, weights are computed for each predictor variable so that the criterion variable can be estimated or predicted. Regression analyses can be used to predict an individual's score on the criterion variable, based on scores obtained on the predictor variables. In addition, regression analyses allow the researcher to explain the relationship between the predictor variables and criterion variables and to test hypotheses or theories about the nature of this relationship (Thompson, 2006). Just like in linear regression, values for X are transformed into standardized scores, so that each predictor variable can have the same mean and standard deviation. The value for *a* becomes zero, and the Beta weights for each predictor variable represent the change expected in the criterion variable (Y) for each standard deviation increase in the predictor variable (X) (Allison, 1999).

Another statistic that should be reported in multiple regression is the structure coefficients for each predictor variable. Structure coefficients are the correlation coefficients for each predictor variable and the predicted Y scores. Structure coefficients are impacted by any collinearity that exists among the predictor variables, but more accurately reflect how each variable predicts Y in reality. Structure coefficients provide information about the structure or nature of the variables of interest. Like Beta weights, they tell where notable effects originate. The interpretation of both the Beta weights and structure coefficients provides a more complete picture of the data when predictor variables are correlated. A predictor variable with a near zero Beta weight and a large squared structure coefficient might be a useful predictor but the shared predictive power of it was assigned to another variable. A large Beta weight and a small structure coefficient indicates a suppressor effect, an effect that occurs when one predictor variable has little or no correlation with the criterion but makes the other predictor variables better predictors, improving their ability to predict the criterion indirectly. This kind of effect can only occur when some or all of the predictor variables are correlated. Suppressor variables make the R squared effect size larger even though they have little or no correlation with the criterion variable (Courville & Thompson, 2001; Thompson, 1990, 2006).

1.) What is the relationship between scores on the Study Strategies, Note-Taking/ Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the math cluster scores of the WJ-III?

This question was answered using the Pearson *r* and linear regression. First, Pearson *r* coefficients were calculated using the mean scores for each scale of the SMALSI as a predictor variable and the mean score for each math cluster of the WJ-III as a criterion variable. This means that sixteen different Pearson r values were calculated for the full sample and each of the three grade levels. The coefficient of determinism or R squared (R^2) was calculated to determine the amount of variance within each math cluster that was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which the mean score for each of the four scales predicted the mean score for each of the four math cluster scores of the

WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson r and linear regression values was set at 0.01.

2.) What is the relationship between scores on the Reading/Comprehension Strategies and Writing/Research Skills scales and the math cluster scores of the WJ-III?

This question was answered using the Pearson *r* and linear regression. Pearson *r* coefficients were calculated using the mean scores for each scale of the SMALSI as a predictor variable and the mean score for each math cluster of the WJ-III as a criterion variable, resulting in eight different Pearson *r* values being calculated for the full sample and each of the three grade levels. The coefficient of determinism or R squared (R^2) was calculated to determine the amount of variance within each math cluster that was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which the mean score for each scale of the SMALSI predicted the mean score for each math cluster of the WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson *r* and linear regression values was set at 0.01.

3.) What is the relationship between scores on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales and the math cluster scores of the WJ-III?

This question was answered using the Pearson *r* and linear regression. Pearson *r* coefficients were calculated using the mean scores for each scale of the SMALSI as a predictor variable and the mean score for each math cluster of the WJ-III as a criterion variable, resulting in twelve different Pearson *r* values being calculated for the full sample and each of the three grade levels. The coefficient of determinism or R squared (R^2) was calculated to determine the amount of variance within each math cluster that was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which the mean score for each scale of the SMALSI predicted the mean score for each math cluster of the WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson *r* and linear regression values was set at 0.01.

4.) **Can leaning and study strategies as measured by scores on the nine scales of the SMALSI Child Form be used to predict math achievement as measured by the math cluster scores of the WJ-III?**

This question was answered using multiple regression. The mean score for the nine scales of the SMALSI were used as predictor variables and the mean score for each math cluster of the WJ-III was used as a criterion variable. To correct for any experiment-wise Type I error, the alpha level was set at 0.05.

5.) **What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a norm-referenced measure of math achievement, such as the WJ-III?**

This question was answered using the Pearson *r* and linear regression. First, Pearson *r* coefficients were calculated using the mean score for the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks as predictor variables and the mean score for each math cluster of the WJ-III as a criterion variable. The coefficient of determinism or R squared (R^2) was calculated to determine the amount of variance within each math cluster that was explained by each of the AIMSweb Winter Benchmarks. Then, linear regression was used to determine the degree to which the mean score for each of the AIMSweb

Winter Benchmarks predicted the four math cluster scores of the WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson *r* and linear regression values was set at 0.01. To correct for any experiment-wise Type I error, the alpha level for the multiple regression was set at 0.05.

6.) What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a criterion-referenced measure of math achievement, such as the math portion of the Texas Assessment of Knowledge and Skills?

This question will be answered using the Pearson *r* and linear regression. First, Pearson *r* coefficients will be calculated using the mean score for the AIMSweb Math Computation and AIMSweb Concepts and Applications Winter Benchmarks as predictor variables and the mean score for the math section of the Texas Assessment of Knowledge and Skills (TAKS) as a criterion variable. The coefficient of determinism or R squared (R^2) was calculated to determine the amount of variance within scores on the TAKS Math Test that was explained by each of the AIMSweb Winter Benchmarks. Then, linear regression was used to determine the degree to which the mean score for each of the AIMSweb Winter Benchmarks predicted the mean score for the TAKS Math Test. To correct for any experiment-wise Type I error, the alpha level for the Pearson *r* and linear regression values was set at 0.01. To correct for any experiment-wise Type I error, the alpha level for the multiple regression was set at 0.05.

7.) Are there differences in the relationship between scores obtained on the SMALSI and scores obtained on measures of math achievement across the three grade levels?

This question was answered using a one-way ANOVA. The three grade levels served as the grouping variable and the mean of the raw scores obtained on the scales of the SMALSI for each grade level were the intervally-scaled variables compared. To correct for any experiment-wise Type I error, the alpha level was set at 0.01.

8.) Are there differences in the relationship between scores obtained on the SMALSI and scores obtained on measures of math achievement based on gender?

This question was answered using a one-way ANOVA. Gender served as the grouping variable and the mean of the raw scores obtained for males and females on the scales of the SMALSI were the intervally-scaled variables compared. To correct for any experiment-wise Type I error, the alpha level was set at 0.01.

9.) Is there an interaction effect on level of school motivation and learning and study strategies being reported by students on the SMALSI based on grade level and gender?

This question was answered using a two-way factorial ANOVA. Gender and grade level served as the grouping variables and the mean of the raw scores on the scales of the SMALSI were the intervally-scaled variables compared. To correct for any experiment-wise Type I error, the alpha level was set at 0.01.

Procedure

Data for this study was collected across one academic semester, during the spring of 2010. Prior to the start of data collection, approval for this study was obtained by the Institutional Review Board, a committee that monitors research involving humans and is overseen by the Office of Research Compliance at Texas A&M University. The researcher selected thirteen undergraduate students to serve as research assistants through the duration of the study and led a series of training sessions to train the assistants on the standardized procedures for administrating the assessment instruments and entering data into SPSS. The researcher gave a brief presentation to teachers about the study during a faculty meeting. Parents were notified about the study through the weekly newsletter sent home by the school. In addition, the researcher gave a brief presentation to parents about the study during a monthly meeting for the campus chapter of the Parent Teacher Organization. An informed consent document was made available to parents attending the monthly meeting and was sent home with students in their weekly folder. The informed consent document was available in both English and Spanish and included information about how long participation in the study would take and potential benefits for participating in the study.

The testing session lasted approximately forty-five minutes for each child. Potential benefits for participating included a score report that provided parents with a summary of the child's performance, allowing the parent to learn about their child's achievement levels in mathematics and strengths and weaknesses in knowledge and use of study skills. As part of giving informed consent, parents agreed to allow the researcher to obtain demographic information about their child, their child's academic program, as well as their child's scores on the AIMSweb Winter Benchmarks and the TAKS math test. This information was retrieved from the District's Department of Research and Program Evaluation. Informed consent documents were collected by the researcher at the time of the PTO meeting. Classroom teachers collected informed consent documents from students who brought them to school after the monthly meeting. Classroom teachers were provided a gift certificate to a local teacher supply store for their assistance in the completion of this project. Parental permission and student assent was obtained for all students interested in participating. All consenting parents completed a demographic information questionnaire. The demographic information questionnaire was available in both English and Spanish and included a home language survey.

On different dates throughout the semester, a time was scheduled for the SMALSI and WJ-III to be administered to the students participating in the study. On the day of testing, the SMALSI was completed in a small group setting. An audio recording of the items on the SMALSI available from the publisher was played during the group administration, and students were given ten seconds after each item was read to respond to the item. The WJ-III subtests were administered individually to each student participant by a trained research assistant. At the conclusion of the individual testing session, student participants received a #2 pencil, ruler, solar-powered calculator, and a booklet about the benefits of staying in school and taking advanced courses in mathematics. All of these items were provided to the researcher by the Department of Mathematics at Texas A&M University. Scores for the student participants on the AIMSweb Winter Benchmarks and the TAKS math test were obtained from their academic records and compiled for the researcher by the District's Department of Research and Program Evaluation. Since all of this data was used for research purposes, each student participant was assigned an identification number. The data for each student participant was filed separately, and the only personal information used was the student's identification number. The student demographic information sheet and roster of names and identification numbers was kept separate from participant data to ensure the confidentiality of the student participants.

During the data entry process, a separate data base for the demographic information was created, substituting the identification number for the students' names. Data was entered into SPSS by either the researcher or one of the research assistants. Another member of the research team verified the accuracy of the entered data. Once the data was verified, it was analyzed using SPSS. Before reporting the obtained statistics, the accuracy of the statistics were verified by editing the syntax file to ensure it was free of errors and re-running the analyses using SPSS.

CHAPTER IV

RESULTS

The purpose of this chapter is to present the findings of the study and its nine research questions. The chapter is divided into three parts. In the first part, the descriptive statistics for each measure are displayed for the full sample, male and female participant groups, and three grade levels. In the second part, the reliability coefficients for the scores from each measure are displayed for the full sample, male and female participant groups, and three grade levels. The final section of the chapter is organized around the nine research questions. The statistics used to answer each question are reported and a brief explanation is provided.

Descriptive Statistics

Descriptive statistics for the math clusters and subtests of the Woodcock-Johnson III Tests of Achievement (WJ-III) are displayed in Tables 20 through 25. Table 20 displays the descriptive statistics for the full sample of study participants. All of the descriptive statistics for the full sample were calculated using the Age-Based norms of the WJ-III. Scores on the Broad Math cluster range from 28 to 136 (M = 99.22, SD = 14.761), with higher scores indicating higher levels of broad math achievement. Scores on the Brief Math cluster range from 26 to 132 (M = 98.57, SD = 14.515), with higher scores indicating higher levels of brief math achievement. Score on the Math Calculation Skills cluster range from 16 to 130 (M = 99.86, SD = 14.665), with higher scores indicating higher levels of basic math skills. Scores on the Math Reasoning cluster range from 41 to 135 (M = 98.78, SD = 13.420), with higher scores indicating higher levels of mathematical knowledge and reasoning. Scores on the Calculation subtest range from 19 to 126 (M = 99.66, SD = 13.657), with higher scores indicating higher ability to perform mathematical computations that are fundamental to more complex math reasoning and problem solving. Scores on the Math Fluency subtest range from 56 to 146 (*M* = 100.26, *SD* = 13.612), with higher scores indicating higher automaticity when solving simple addition, subtraction, and multiplication facts. Scores on the Applied Problems subtest range from 37 to 130 (*M* = 98.14, *SD* = 13.614), with higher scores indicating higher ability to analyze and solve practical math problems. Scores on the Quantitative Concepts subtest range from 43 to 131 (*M* = 99.23, *SD* = 13.143), with higher scores indicating higher knowledge of mathematical terms and formulas and higher ability to figure out and work with numerical patterns.

Table 20
WJ-III Descriptive Statistics, Full Sample (n=176)

CLUSTER/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	28	136	108	96	99.50	99.22	14.761	217.899	1.113	-1.484	6.240
BRIEF MATH	26	132	106	91 99	99	98.57	14.515	210.692	1.094	-1.631	6.931
MATH CALCULATION SKILLS	16	130	114	91 95 103 108	101	99.86	14.665	215.056	1.105	-1.948	8.867
Calculation	19	126	107	99	100.50	99.66	13.657	186.523	1.029	-2.244	10.450
Math Fluency	56	146	90	98	100	100.26	13.612	185.280	1.026	0.059	1.032
MATH REASONING	41	135	94	95	99	98.78	13.420	180.090	1.012	-0.829	3.138
Applied Problems	37	130	93	89 95 103	97.50	98.14	13.614	185.345	1.026	-0.928	3.173
Quantitative Concepts	43	131	88	96	100	99.23	13.143	172.737	0.991	-0.863	2.560

Inspection of the frequency tables (see Appendix Tables A1a through A1h) and visual inspection of the distributions (see Appendix Figures B1a through B1h) show that the Broad

Math cluster starts with a short tail and three extremely low scores that are outliers, the majority of scores fall between 89 and 113, the distribution peaks below the mean, and ends with a short tail and two high scores that are outliers. The distribution for the Brief Math cluster starts with a short tail and three extremely low scores that are outliers, the majority of scores fall between 89 and 112, the distribution peaks below and at the mean, and ends with a short tail and two high scores that are outliers. The distribution for the Math Calculation Skills cluster starts with a short tail and three extremely low scores that are outliers, the majority of scores fall between 90 and 114, the distribution peaks below and above the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail and three extremely low scores that are outliers, the majority of scores fall between 90 and 112, the distribution peaks at the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail and three low scores that are outliers, the majority of scores fall between 88 and 115, the distribution peaks below the mean, and ends with a short tail. The distribution for the Math Reasoning cluster starts with a short tail and three low scores that are outliers, the majority of scores fall between 89 and 112, the distribution peaks below the mean, and ends with a short tail. The distribution for the Applied Problems subtest starts with a short tail and three low scores that are outliers, the majority of scores fall between 88 and 112, the distribution peaks below and above the mean, and ends with a short tail. The distribution for the Quantitative Concepts subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 89 and 113, the distribution peaks below the mean, and ends with a short tail.

Table 21 displays the descriptive statistics for the female participants. All of the descriptive statistics for the female participants were calculated using the Age-Based norms of the WJ-III. Scores on the Broad Math cluster range from 28 to 136 (M = 98.89, SD = 13.440).

Scores on the Brief Math cluster range from 26 to 132 (*M* = 98.02, *SD* = 13.207). Scores on the Math Calculation Skills cluster range from 29 to 130 (*M* = 100.37, *SD* = 12.674). Scores on the Math Reasoning cluster range from 41 to 135 (*M* = 98.01, *SD* = 12.733). Scores on the Calculation subtest range from 33 to 126 (*M* = 99.73, *SD* = 11.679). Scores on the Math Fluency subtest range from 59 to 138 (*M* = 101.39, *SD* = 12.323). Scores on the Applied Problems subtest range from 41 to 135 (*M* = 97.29, *SD* = 13.141). Scores on the Quantitative Concepts range from 52 to 131 (*M* = 98.80, *SD* = 12.642).

Table 21

WJ-III Descriptive Statistics, Females (n=89)

Cluster/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	28	136	108	90 96	98	98.89	13.440	180.624	1.425	-1.236	8.292
BRIEF MATH	26	132	106	102	98	98.02	13.207	174.431	1.400	-1.545	9.461
MATH CALCULATION SKILLS	29	130	101	105	101	100.37	12.674	160.622	1.343	-1.685	10.578
Calculation	33	126	93	99 104	100	99.73	11.679	136.404	1.238	-1.927	11.177
Math Fluency	59	138	79	94 98	100	101.39	12.323	151.855	1.306	0.207	1.403
MATH REASONING	41	135	94	85 95 103	99	98.01	12.733	162.125	1.350	-0.643	4.020
Applied Problems	37	130	93	88 95	97	97.29	13.141	172.686	1.393	-0.871	4.297
Quantitative Concepts	52	131	79	94 102 103	99	98.80	12.642	159.822	1.340	-0.646	1.985

Inspection of the frequency tables (see Appendix Tables A2a through A2h) and visual inspection of the distributions (see Appendix Figures B2a through B2h) shows that the Broad Math cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 90 and 111, the distribution peaks below the mean, and ends with a short tail and two high scores that are outliers. The distribution for the Brief Math cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 89 and 110, the distribution peaks above the mean, and ends with a short tail and two high scores that are outliers. The distribution for the Math Calculation Skills cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 91 and 111, the distribution peaks above the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 91 and 109, the distribution peaks at and above the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail and one low score that is an outlier, the majority of scores fall between 91 and 115, the distribution peaks below the mean, and ends with a short tail. The distribution for the Math Reasoning cluster starts with a short tail and one low score that is an outlier, the majority of scores fall between 87 and 109, the distribution peaks below and above the mean, and ends with a short tail and one high score that is an outlier. The distribution for the Applied Problems subtest starts with a short tail and one low score that is an outlier, the majority of scores fall between 88 and 112, the distribution peaks below the mean, and ends with a short tail. The distribution for the Quantitative Concepts subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 89 and 111, the distribution peaks below and above the mean, and ends with a short tail and one high score that is an outlier.

Table 22 displays the descriptive statistics for the male participants. All of the descriptive statistics for the male participants were calculated using the Age-Based norms of the WJ-III. Scores on the Broad Math cluster range from 29 to 123 (*M* = 99.56, *SD* = 16.073). Scores on the Brief Math cluster range from 29 to 123 (*M* = 99.14, *SD* = 15.799). Scores on the Math Calculation Skills cluster range from 16 to 124 (*M* = 99.34, *SD* = 16.514). Scores on the Math Reasoning cluster range from 46 to 129 (*M* = 99.57, *SD* = 14.118). Scores on the Calculation subtest range from 19 to 122 (*M* = 99.59, *SD* = 15.491). Scores on the Math Fluency subtest range from 59 to 138 (*M* = 101.39, *SD* = 12.323). Scores on the Applied Problems subtest range from 41 to 135 (*M* = 97.29, *SD* = 13.141). Scores on the Quantitative Concepts range from 52 to 131 (*M* = 98.80, *SD* = 12.642).

Table 22

WJ-III Descriptive Statistics, Males (n=87)

CLUSTER/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	29	123	94	89	101	99.56	16.073	258.342	1.723	-1.647	5.197
BRIEF MATH	29	123	94	99	99	99.14	15.799	249.609	1.694	-1.714	5.706
MATH CALCULATION SKILLS	16	124	108	91	101	99.34	16.514	272.717	1.771	-1.990	7.483
Calculation	19	122	103	108	102	99.59	15.491	239.966	1.661	-2.315	9.333
Math Fluency	56	146	90	98	100	99.10	14.797	218.954	1.586	0.046	0.747
MATH REASONING	46	129	83	92 95 99	99	99.57	14.118	199.317	1.514	-1.015	2.808
Applied Problems	45	124	79	89	99	99.01	14.105	198.942	1.512	-1.022	2.605
Quantitative Concepts	43	130	87	96	100	99.67	13.696	187.574	1.468	-1.064	3.203

Inspection of the frequency tables (see Appendix Tables A3a through A3h) and visual inspection of the distributions (see Appendix Figures B3a through B3h) shows that the Broad Math cluster starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 88 and 115, the distribution peaks below the mean, and ends with a short tail. The distribution for the Brief Math cluster starts with a short fat tail and two extremely low scores that are outliers, the majority of scores fall between 88 and 114, the distribution peaks at the mean, and ends with a short tail. The distribution for the Math Calculation Skills cluster starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 90 and 115, the distribution peaks below the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 89 and 114, the distribution peaks above the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 85 and 113, the distribution peaks at the mean, and ends with a short tail and one high score that is an outlier. The distribution for the Math Reasoning cluster starts with a short tail and two low scores that are outliers, the majority of scores fall between 89 and 114, the distribution peaks below and at the mean, and ends with a short tail. The distribution for the Applied Problems subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 88 and 112, the distribution peaks below the mean, and ends with a short but slightly taller tail. The distribution for the Quantitative Concepts subtest starts with a short tail and one low score that is an outlier, the majority of scores fall between 89 and 113, the distribution peaks below the mean, and ends with a short tail.

Table 23 displays the descriptive statistics for the participants enrolled in the Third Grade. All of the descriptive statistics for the participants enrolled in Third Grade were calculated using the Grade-Based norms of the WJ-III. Scores on the Broad Math cluster range from 22 to 126 (*M* = 98.22, *SD* = 17.862). Scores on the Brief Math cluster range from 21 to 121 (*M* = 97.93, *SD* = 17.727). Scores on the Math Calculation Skills cluster range from 30 to 129 (*M* = 101.07, *SD* = 16.679). Scores on the Math Reasoning cluster range from 44 to 127 (*M* = 97.87, *SD* = 15.387). Scores on the Calculation subtest range from 35 to 128 (*M* = 101.97, *SD* = 15.889). Scores on the Math Fluency subtest range from 62 to 126 (*M* = 98.48, *SD* = 12.695). Scores on the Applied Problems subtest range from 40 to 123 (*M* = 97.87, *SD* = 15.437). Scores on the Quantitative Concepts range from 57 to 128 (*M* = 99.18, *SD* = 14.864).

Table 23
WJ-III Descriptive Statistics, Third Graders (n=60)

CLUSTER/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	22	126	104	102	99.50	98.22	17.862	319.054	2.306	-2.249	8.114
BRIEF MATH	21	121	100	97	99.50	97.93	17.727	314.233	2.288	-2.401	8.789
MATH CALCULATION SKILLS	30	129	99	111	102.50	101.07	16.679	278.199	2.153	-2.252	7.890
Calculation	35	128	93	102	102	101.97	15.889	252.473	2.051	-2.075	7.055
Math Fluency	62	126	64	104	101	98.48	12.695	161.169	1.639	-0.515	0.743
MATH REASONING	44	127	83	96 116	99.50	97.87	15.387	236.762	1.986	-1.195	3.004
Applied Problems	40	123	83	96	96	97.87	15.437	238.287	1.993	-1.400	4.351
Quantitative Concepts	57	128	71	106	101	99.18	14.864	220.932	1.919	-0.894	0.919

Inspection of the frequency tables (see Appendix Tables A4a through A4h) and visual inspection of the distributions (see Appendix Figures B4a through B4h) shows that the Broad Math cluster starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 91 and 115, the distribution peaks above the mean, and ends with a short tail. The distribution for the Brief Math cluster starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 89 and 113, the distribution peaks at the mean, and ends with a short but slightly taller tail. The distribution for the Math Calculation Skills cluster starts with a short tail and two extremely low scores that are outliers, the majority of scores fall between 96 and 112, the distribution peaks above the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 93 and 118, the distribution peaks at the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 86 and 112, the distribution peaks above the mean, and ends with a short tail. The distribution for the Math Reasoning cluster starts with a short tail and two low scores that are outliers, the majority of scores fall between 86 and 115, the distribution peaks at and above the mean, and ends with a short tail. The distribution for the Applied Problems subtest starts with a short tail and two low scores that are outliers, the majority of scores fall between 89 and 114, the distribution peaks at the mean, and ends with a short tail. The distribution for the Quantitative Concepts subtest starts with a short tail, the majority of scores fall between 88 and 111, the distribution peaks above the mean, and ends with a short tail.

Table 24 displays the descriptive statistics for the participants enrolled in the Fourth Grade. All of the descriptive statistics for the participants enrolled in Fourth Grade were calculated using the Grade-Based norms of the WJ-III. Scores on the Broad Math cluster range from 75 to 118 (*M* = 98.35, *SD* = 10.792). Scores on the Brief Math cluster range from 71 to 117 (*M* = 97.24, *SD* = 10.511). Scores on the Math Calculation Skills cluster range from 77 to 124 (*M* = 100.85, *SD* = 10.453). Scores on the Math Reasoning cluster range from 78 to 121 (*M* = 98.37, *SD* = 9.922). Scores on the Calculation subtest range from 80 to 122 (*M* = 99.81, *SD* = 7.808). Scores on the Math Fluency subtest range from 75 to 151 (*M* = 102.34, *SD* = 15.056). Scores on the Applied Problems subtest range from 69 to 123 (*M* = 96.90, *SD* = 11.339). Scores on the Quantitative Concepts range from 79 to 122 (*M* = 100.06, *SD* = 9.121).

Table 24
WJ-III Descriptive Statistics, Fourth Graders (n=68)

CLUSTER/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	75	118	43	96	98	98.35	10.792	116.471	1.309	-0.032	-0.570
BRIEF MATH	71	117	46	95 99	97	97.24	10.511	110.481	1.275	-0.105	-0.180
MATH CALCULATION SKILLS	77	124	47	93	100.50	100.85	10.453	109.262	1.268	0.149	-0.625
Calculation	80	122	42	105	101	99.81	7.808	60.963	0.947	0.166	0.328
Math Fluency	75	151	76	94 96 98	99.50	102.34	15.056	226.675	1.826	0.643	0.527
MATH REASONING	78	121	43	92 94	96	98.37	9.922	98.445	1.203	0.249	-0.442
Applied Problems	69	123	54	87 96	96	96.90	11.339	128.571	1.375	0.026	-0.283
Quantitative Concepts	79	122	43	94 104	100	100.06	9.121	83.191	1.106	-0.124	0.102

Inspection of the frequency tables (see Appendix Tables A5a through A5h) and visual inspection of the distributions (see Appendix Figures B5a through B5h) shows that the Broad Math cluster starts with a short tail, the majority of scores fall between 88 and 111, the distribution peaks slightly below the mean, and ends with a tall tail. The distribution for the Brief Math cluster starts with a short tail, the majority of scores fall between 87 and 109, the distribution peaks slightly below and slightly above the mean, and ends with a tall tail. The distribution for the Math Calculation Skills cluster starts with a short tail, the majority of scores fall between 89 and 113, the distribution peaks below the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail, the majority of scores fall between 93 and 105, the distribution peaks above the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail, the majority of scores fall between 89 and 118, the distribution peaks below the mean, and ends with a short tail and one high score that is an outlier. The distribution for the Math Reasoning cluster starts with a short tail, the majority of scores fall between 89 and 109, the distribution peaks below the mean, and ends with a short tail. The distribution for the Applied Problems subtest starts with a short tail, the majority of scores fall between 87 and 111, the distribution peaks at and below the mean, and ends with a short tail. The distribution for the Quantitative Concepts subtest starts with a tall tail and one low score that is an outlier, the majority of scores fall between 92 and 109, the distribution peaks below and above the mean, and ends with a short tail.

Table 25 displays the descriptive statistics for the participants enrolled in the Fifth Grade. All of the descriptive statistics for the participants enrolled in Fifth Grade were calculated using the Grade-Based norms of the WJ-III. Scores on the Broad Math cluster range from 23 to 125 (M = 99.56, SD = 16.358). Scores on the Brief Math cluster range from 20 to 124 (M = 98.88, *SD* = 16.374). Scores on the Math Calculation Skills cluster range from 12 to 127 (*M* = 98.40, *SD* = 17.095). Scores on the Math Reasoning cluster range from 44 to 130 (*M* = 99.83, *SD* = 13.417). Scores on the Calculation subtest range from 8 to 121 (*M* = 97.92, *SD* = 16.993). Scores on the Math Fluency subtest range from 55 to 139 (*M* = 101.44, *SD* = 13.615). Scores on the Applied Problems subtest range from 49 to 123 (*M* = 99.94, *SD* = 13.200). Scores on the Quantitative Concepts range from 44 to 133 (*M* = 98.75, *SD* = 12.850).

Table 25
WJ-III Descriptive Statistics, Fifth Graders (n=48)

CLUSTER/ Subtest	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
BROAD MATH	23	125	102	97	98	99.56	16.358	267.570	2.361	-1.958	9.116
BRIEF MATH	20	124	104	85 88	99	98.88	16.374	268.112	2.363	-2.236	10.404
MATH CALCULATION SKILLS	12	127	115	89	99.50	98.40	17.095	292.244	2.467	-2.267	13.084
Calculation	8	121	113	102 110	102	97.92	16.993	288.759	2.453	-3.165	16.107
Math Fluency	55	139	84	96 105	100.50	101.44	13.615	185.358	1.965	-0.219	2.543
MATH REASONING	44	130	86	101	101	99.83	13.417	180.014	1.937	-1.230	5.455
Applied Problems	49	123	74	90 98	102	99.94	13.200	174.230	1.905	-1.021	3.322
Quantitative Concepts	44	133	89	97	97	98.75	12.850	165.128	1.855	-1.242	6.724

Inspection of the frequency tables (see Appendix Tables A6a through A6h) and visual inspection of the distributions (see Appendix Figures B6a through B6h) shows that the Broad Math cluster starts with a short tail with one extremely low score that is an outlier, the majority of scores fall between 89 and 115, the distribution peaks slightly below the mean, and ends with a short tail. The distribution for the Brief Math cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 88 and 115, the distribution peaks below the mean, and ends with a short tail. The distribution for the Math Calculation Skills cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 88 and 114, the distribution peaks below the mean, and ends with a short tail. The distribution for the Calculation subtest starts with a short tail and an extremely low score that is an outlier, the majority of scores fall between 87 and 110, the distribution peaks above the mean, and ends with a short tail. The distribution for the Math Fluency subtest starts with a short tail and a low score that is an outlier, the majority of scores fall between 92 and 117, the distribution peaks below and above the mean, and ends with a short tail and one high score that is an outlier. The distribution for the Math Reasoning cluster starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 91 and 110, the distribution peaks slightly the mean, and ends with a short tail. The distribution for the Applied Problems subtest starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 90 and 112, the distribution peaks at and below the mean, and ends with a short tail. The distribution for the Quantitative Concepts subtest starts with a short tail and one extremely low score that is an outlier, the majority of scores fall between 91 and 110, the distribution peaks at the mean, and ends with a short tail and one high score that is an outlier.

Descriptive statistics for the scales of the School Motivation and Learning Strategies Inventory (SMALSI), Child Form (Ages 8 to 12) are displayed in Tables 26 through 31. Table 26 displays the descriptive statistics for the full sample of study participants. All of the descriptive statistics for the SMALSI were calculated using the norms from the normative sample. Scores on the Study Strategies scale range from 20 to 75 (M = 48.68, SD = 10.555), with higher scores indicating higher skill level in selecting important information, relating new to previously learned information, and memory strategies for encoding information. Scores on the Note Taking/Listening Skills scale range from 25 to 75 (M = 48.16, SD = 10.583), with higher scores indicating higher skill level in discriminating important material when taking notes, organizing notes, and efficiency in note taking. Scores on the Reading/Comprehension Strategies scale range from 24 to 76 (M = 49.27, SD = 10.683), with higher scores indicating higher skill level in previewing, monitoring, and reviewing texts, including self-testing to ensure self-understanding. Scores on the Writing/Research Skills scale range from 22 to 80 (M = 51.25, SD = 11.742), with higher scores indicating higher skill level in researching topics in a variety of ways, organizing writing projects, and monitoring and self-checking for errors. Scores on the Test-Taking Strategies scale range from 25 to 77 (M = 50.95, SD = 11.276), with higher scores indicating higher skill level in increasing efficiency in test taking, including eliminating unlikely answers and strategic guessing. Scores on the Time Management/Organizational Techniques scale range from 25 to 80 (M = 47.64, SD = 9.925), with higher scores indicating higher skill level in effective use of time to complete assignments, understanding of time needed for academic tasks, organizing class and study materials, structuring assignments including homework and other projects. Scores on the Low Academic Motivation range from 27 to 78 (M = 50.89, SD = 11.817), with higher scores indicating a higher lack of intrinsic motivation to engage and succeed in academic tasks. Scores on the Test Anxiety scale range from 27 to 80

(M = 51.14, SD = 10.356), with higher scores indicating the student is experiencing a higher level of debilitating symptoms of test anxiety and lowered performance on tests due to excessive worry. Scores on the Concentration/Attention Difficulties scale range from 20 to 77 (M = 50.05, SD = 12.736), with higher scores indicating more difficulty attending to lectures and other academic tasks, monitoring and adjusting attention to performance, and concentrating and avoiding distractions.

Table 26

SMALSI Descriptive Statistics, Full Sample (n=176)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	20	75	55	47	49	48.68	10.555	111.409	0.796	-0.016	-0.492
Note-Taking/ Listening Skills	25	75	50	57	49	48.16	10.583	111.990	0.798	-0.064	-0.618
Reading/ Comprehension Strategies	24	76	52	53	49	49.27	10.683	114.128	0.805	0.010	-0.155
Writing/ Research Skills	22	80	58	45	52	51.25	11.742	137.880	0.885	0.083	-0.136
Test-Taking Strategies	25	77	52	53 54	51	50.95	11.276	127.146	0.850	-0.030	-0.645
Time Management/ Organizational Techniques	25	80	55	47	47	47.64	9.925	98.505	0.748	0.244	0.342
Low Academic Motivation	27	78	51	41 43 49	50.50	50.89	11.817	139.633	0.891	0.012	-0.729
Test Anxiety	27	80	53	48	50	51.14	10.356	107.238	0.781	0.315	-0.178
Concentration/ Attention Difficulties	20	77	57	43	49.50	50.05	12.736	162.209	0.960	0.216	-0.416

Inspection of the frequency tables (see Appendix Tables A7a through A7i) and visual inspection of the distributions (see Appendix Figures B7a through B7i) shows that the Study Strategies scale starts with a short tail, the majority of scores fall between 39 and 60, the distribution peaks at the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a short tail, the majority of scores fall between 35 and 59, the distribution peaks above the mean, and ends with a short tail. The distribution for the Reading/Comprehension Strategies scale starts with a tall tail, the majority of scores fall between 39 and 60, the distribution peaks above the mean, and ends with a short tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 40 and 63, the distribution peaks below the mean, and ends with a short tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 39 and 63, the distribution peaks slightly above the mean, and ends with a tall tail. The distribution for the Time Management/Organizational Techniques scale starts with a short tail, the majority of scores fall between 38 and 57, the distribution peaks at the mean, and ends with a short tail. The distribution for the Low Academic Motivation scale starts with a tall tail, the majority of scores fall between 39 and 64, the distribution peaks below the mean, and ends with a short tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 41 and 62, the distribution peaks below the mean, and ends with a short tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 38 and 64, the distribution peaks below the mean, and ends with a tall tail.

Table 27 displays the descriptive statistics for the female participants. Scores on the Study Strategies scale range from 24 to 75 (*M* = 50.84, *SD* = 10.696). Scores on the Note Taking/Listening Skills scale range from 30 to 75 (*M* = 50.47, *SD* = 10.053). Scores on the Reading/Comprehension Strategies scale range from 26 to 76 (*M* = 52.13, *SD* = 11.061). Scores on the Writing/Research Skills scale range from 22 to 80 (*M* = 53.48, *SD* = 12.370). Scores on the Test-Taking Strategies scale range from 29 to 77 (*M* = 53.56, *SD* = 10.748). Scores on the Time Management/Organizational Techniques scale range from 28 to 80 (*M* = 50.02, *SD* = 10.697). Scores on the Low Academic Motivation range from 27 to 78 (*M* = 50.97, *SD* = 11.717). Scores on the Test Anxiety scale range from 27 to 80 (*M* = 52.51, *SD* = 10.514). Scores on the Concentration/Attention Difficulties scale range from 20 to 77 (*M* = 48.85, *SD* = 12.763).

Table 27
SMALSI Descriptive Statistics, Females (n=89)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	24	75	51	47 52 55	52	50.84	10.696	114.407	1.134	-0.217	-0.269
Note-Taking/ Listening Skills	30	75	45	54	52	50.47	10.053	101.070	1.066	-0.115	-0.348
Reading/ Comprehension Strategies	26	76	50	53	52	52.13	11.061	122.345	1.172	-0.040	-0.152
Writing/ Research Skills	22	80	58	55 61	53	53.48	12.370	153.025	1.311	0.107	-0.356
Test-Taking Strategies	29	77	48	51 53 66	53	53.56	10.748	115.522	1.139	-0.128	-0.503
Time Management/ Organizational Techniques	28	80	52	47	49	50.02	10.697	114.431	1.134	0.197	0.092
Low Academic Motivation	27	78	51	48	49	50.97	11.717	137.283	1.242	0.065	-0.799
Test Anxiety	27	80	53	57	53	52.51	10.514	110.548	1.115	0.022	-0.291
Concentration/ Attention Difficulties	20	77	57	42 56	49	48.85	12.763	162.899	1.353	0.289	-0.214

Inspection of the frequency tables (see Appendix Tables A8a through A8i) and visual inspection of the distributions (see Appendix Figures B8a through B8i) shows that the Study Strategies scale starts with a short tail, the majority of scores fall between 41 and 62, the distribution peaks below and above the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a short tail, the majority of scores fall between 38 and 60, the distribution peaks above the mean, and ends with a shorter tail. The distribution for the Reading/ Comprehension Strategies scale starts with a short tail, the majority of scores fall between 42 and 63, the distribution peaks at the mean, and ends with a shorter tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 42 and 67, the distribution peaks above the mean, and ends with a tall tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 44 and 66, the distribution peaks slightly below, at, and above the mean, and ends with a shorter tail. The distribution for the Time Management/Organizational Techniques scale starts with a tall tail, the majority of scores fall between 39 and 61, the distribution peaks below the mean, and ends with a short tail. The distribution for the Low Academic Motivation scale starts with a short tail, the majority of scores fall between 39 and 64, the distribution peaks slightly below the mean, and ends with a shorter tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 42 and 64, the distribution peaks above the mean, and ends with a shorter tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 38 and 62, the distribution peaks below and above the mean, and ends with a tall tail.

Table 28 displays the descriptive statistics for the male participants. Scores on the Study Strategies scale range from 20 to 68 (M = 46.46, SD = 9.990). Scores on the Note Taking/Listening Skills scale range from 25 to 69 (M = 45.80, SD = 10.645). Scores on the Reading/Comprehension Strategies scale range from 24 to 62 (M = 46.33, SD = 9.478). Scores on the Writing/Research Skills scale range from 24 to 75 (M = 48.97, SD = 10.656). Scores on the Test-Taking Strategies scale range from 25 to 73 (M = 48.28, SD = 11.235). Scores on the Time Management/Organizational Techniques scale range from 25 to 67 (M = 45.21, *SD* = 8.455). Scores on the Low Academic Motivation range from 27 to 74 (*M* = 50.80, *SD* = 11.985). Scores on the Test Anxiety scale range from 29 to 77 (*M* = 49.74, *SD* = 10.059). Scores on the Concentration/Attention Difficulties scale range from 25 to 77 (*M* = 51.28, *SD* = 12.664).

Table 28
SMALSI Descriptive Statistics, Males (n=87)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	20	68	48	39 43 47 56	46	46.46	9.990	99.809	1.071	0.136	-0.504
Note-Taking/ Listening Skills	25	69	44	43	43	45.80	10.645	113.322	1.141	0.043	-0.810
Reading/ Comprehension Strategies	24	62	38	47	47	46.33	9.478	89.829	1.016	-0.249	-0.558
Writing/ Research Skills	24	75	51	45	50	48.97	10.656	113.545	1.142	-0.171	-0.152
Test-Taking Strategies	25	73	48	42 54	48	48.28	11.235	126.225	1.205	0.115	-0.661
Time Management/ Organizational Techniques	25	67	42	47	46	45.21	8.455	71.492	0.907	-0.127	0.065
Low Academic Motivation	27	74	47	52	52	50.80	11.985	143.647	1.285	-0.037	-0.642
Test Anxiety	29	77	48	48	48	49.74	10.059	101.173	1.078	0.644	0.361
Concentration/ Attention Difficulties	25	77	52	33 43 48	50	51.28	12.664	160.388	1.358	0.154	-0.542

Inspection of the frequency tables (see Appendix Tables A9a through A9i) and visual inspection of the distributions (see Appendix Figures B9a through B9i) shows that the Study Strategies scale starts with a short tail with one low score that is an outlier, the majority of scores fall between 36 and 56, the distribution peaks below, at, and above the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a tall tail, the majority of scores fall between 34 and 57, the distribution peaks slightly below the mean, and ends with a short tail. The distribution for the Reading/Comprehension Strategies scale starts with a short tail, the majority of scores fall between 36 and 58, the distribution peaks at the mean, and ends with a tall tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 40 and 59, the distribution peaks below the mean, and ends with a short tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 36 and 61, the distribution peaks slightly below and above the mean, and ends with a short tail. The distribution for the Time Management/ Organizational Techniques scale starts with a short tail, the majority of scores fall between 38 and 54, the distribution peaks slightly above the mean, and ends with a short tail. The distribution for the Low Academic Motivation scale starts with a tall tail, the majority of scores fall between 39 and 64, the distribution peaks slightly above the mean, and ends with a short tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 40 and 58, the distribution peaks at the mean, and ends with a tall tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 41 and 66, the distribution peaks below the mean, and ends with a short but slightly taller tail.

Table 29 displays the descriptive statistics for the participants enrolled in the Third Grade. Scores on the Study Strategies scale range from 24 to 70 (M = 48.83, SD = 11.104). Scores on the Note Taking/Listening Skills scale range from 25 to 74 (M = 48.70, SD = 11.159). Scores on the Reading/Comprehension Strategies scale range from 24 to 74 (M = 49.70, SD = 11.072). Scores on the Writing/Research Skills scale range from 22 to 75 (M = 48.70, SD = 11.550). Scores on the Test-Taking Strategies scale range from 25 to 77 (M = 51.48, SD = 11.223). Scores on the Time Management/Organizational Techniques scale range from 27 to 66 (M = 45.83, SD = 9.370). Scores on the Low Academic Motivation range from 27 to 78 (M = 50.83, SD = 11.627). Scores on the Test Anxiety scale range from 36 to 80 (M = 51.40, SD = 8.716). Scores on the Concentration/Attention Difficulties scale range from 25 to 75 (M = 47.95, SD = 9.885).

Table 29

SMALSI Descriptive Statistics, Third Graders (n=60)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	24	70	46	47 62	49	48.83	11.104	123.294	1.433	-0.165	-0.838
Note-Taking/ Listening Skills	25	74	49	57	50	48.70	11.159	124.519	1.441	-0.073	-0.553
Reading/ Comprehension Strategies	24	74	50	45	51	49.70	11.072	122.586	1.429	-0.256	-0.374
Writing/ Research Skills	22	75	53	47	47	48.70	11.550	133.400	1.491	-0.053	-0.264
Test-Taking Strategies	25	77	52	59	53	51.48	11.223	125.949	1.449	-0.207	-0.284
Time Management/ Organizational Techniques	27	66	39	39	46.50	45.83	9.370	87.802	1.210	-0.059	-0.311
Low Academic Motivation	27	78	51	45 60	52.50	50.83	11.627	135.192	1.501	-0.149	-0.529
Test Anxiety	36	80	44	48	49.50	51.40	8.716	75.973	1.125	0.651	0.767
Concentration/ Attention Difficulties	25	75	50	42	47	47.95	9.885	97.709	1.276	0.542	0.548

Inspection of the frequency tables (see Appendix Tables A10a through A10i) and visual inspection of the distributions (see Appendix Figures B10a through B10i) shows that the Study Strategies scale starts with a short tail, the majority of scores fall between 36 and 60, the distribution peaks at and above the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a short tail, the majority of scores fall between 37 and 60, the distribution peaks above the mean, and ends with a short tail. The distribution for the

Reading/Comprehension Strategies scale starts with a short tail, the majority of scores fall between 36 and 60, the distribution peaks below the mean, and ends with a short tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 38 and 59, the distribution peaks at the mean, and ends with a short tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 40 and 63, the distribution peaks slightly above the mean, and ends with a short tail. The distribution for the Time Management/Organizational Techniques scale starts with a tall tail, the majority of scores fall between 38 and 55, the distribution peaks below the mean, and ends with a short tail. The distribution for the Low Academic Motivation scale starts with a short tail, the majority of scores fall between 39 and 63, the distribution peaks below and above the mean, and ends with a shorter tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 43 and 59, the distribution peaks below the mean, and ends with a short tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 39 and 57, the distribution peaks below the mean, and ends with a short tail.

Table 30 displays the descriptive statistics for the participants enrolled in the Fourth Grade. Scores on the Study Strategies scale range from 30 to 75 (M = 49.82, SD = 10.309). Scores on the Note Taking/Listening Skills scale range from 25 to 75 (M = 48.66, SD = 10.810). Scores on the Reading/Comprehension Strategies scale range from 31 to 76 (M = 49.97, SD = 10.316). Scores on the Writing/Research Skills scale range from 29 to 80 (M = 54.24, SD = 12.675). Scores on the Test-Taking Strategies scale range from 28 to 73 (M = 51.97, SD = 11.712). Scores on the Time Management/Organizational Techniques scale range from 29 to 80 (M = 50.57, SD = 10.816). Scores on the Low Academic Motivation range from 27 to 74

(*M* = 50.51, *SD* = 12.941). Scores on the Test Anxiety scale range from 29 to 77 (*M* = 49.63, *SD* = 10.953). Scores on the Concentration/Attention Difficulties scale range from 20 to 77 (*M* = 49.79, *SD* = 15.599).

Table 30

SMALSI Descriptive Statistics, Fourth Graders (n=68)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	30	75	45	47 58	49	49.82	10.309	106.267	1.250	0.251	-0.515
Note Taking/ Listening Skills	25	75	50	53	51	48.66	10.810	116.854	1.311	-0.106	-0.635
Reading/ Comprehension Strategies	31	76	45	39 44 47 48 51 53 60	48.50	49.97	10.316	106.417	1.251	0.577	0.015
Writing/ Research Skills	29	80	51	57	54	54.24	12.675	160.660	1.537	0.139	0-.426
Test-Taking Strategies	28	73	45	51	51	51.97	11.712	137.163	1.420	0.021	-0.899
Time Management/ Organizational Techniques	29	80	51	47	50	50.57	10.816	116.955	1.312	0.330	0.230
Low Academic Motivation	27	74	47	35 39 61	49	50.51	12.941	167.477	1.569	0.075	-1.097
Test Anxiety	29	77	48	39 41	48.50	49.63	10.953	119.967	1.328	0.282	-0.577
Concentration/ Attention Difficulties	20	77	57	33 43	49	49.79	15.599	243.330	1.892	0.132	-1.019

Inspection of the frequency tables (see Appendix Tables A11a through A11i) and visual inspection of the distributions (see Appendix Figures B11a through B11i) shows that the Study Strategies scale starts with a short tail, the majority of scores fall between 40 and 59, the distribution peaks slightly below and well above the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a short tail, the majority of scores fall between 35 and 59, the distribution peaks above the mean, and ends with a short tail. The distribution for the Reading/Comprehension Strategies scale starts with a short tail, the majority of scores fall between 39 and 60, the distribution peaks below, at, and above the mean, and ends with a short tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 44 and 67, the distribution peaks above the mean, and ends with a tall tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 40 and 65, the distribution peaks slightly at the mean, and ends with a short but slightly taller tail. The distribution for the Time Management/ Organizational Techniques scale starts with a short tail, the majority of scores fall between 42 and 61, the distribution peaks below the mean, and ends with a shorter tail. The distribution for the Low Academic Motivation scale starts with a tall tail, the majority of scores fall between 37 and 66, the distribution peaks below and above the mean, and ends with a short tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 39 and 62, the distribution peaks twice below the mean, and ends with a shorter tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 33 and 70, the distribution peaks twice below the mean, and ends with a tall tail.

Table 31 displays the descriptive statistics for the participants enrolled in the Fifth Grade. Scores on the Study Strategies scale range from 20 to 70 (*M* = 46.85, *SD* = 10.160). Scores on the Note Taking/Listening Skills scale range from 25 to 65 (*M* = 46.79, *SD* = 9.563). Scores on the Reading/Comprehension Strategies scale range from 26 to 71 (*M* = 47.73, *SD* = 10.770). Scores on the Writing/Research Skills scale range from 25 to 67 (*M* = 50.21, *SD* = 9.726). Scores on the Test-Taking Strategies scale range from 29 to 73 (*M* = 48.83, *SD* = 10.646). Scores on the Time Management/Organizational Techniques scale range from 25 to 62 (*M* = 45.75, *SD* = 8.337). Scores on the Low Academic Motivation range from 27 to 74 (*M* = 51.48, *SD* = 10.531). Scores on the Test Anxiety scale range from 27 to 77 (*M* = 52.94, *SD* = 11.235). Scores on the Concentration/Attention Difficulties scale range from 28 to 76 (*M* = 53.04, *SD* = 10.935).

Table 31
SMALSI Descriptive Statistics, Fifth Graders (n=48)

Scale	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Study Strategies	20	70	50	56	46.50	46.85	10.160	103.234	1.467	-0.198	-0.068
Note Taking/ Listening Skills	25	65	40	43 46	46	46.79	9.563	91.445	1.380	-0.112	-0.754
Reading/ Comprehension Strategies	26	71	45	49	48.50	47.73	10.770	115.989	1.554	-0.327	-0.216
Writing/ Research Skills	25	67	42	45 52 61	52	50.21	9.726	94.594	1.404	-0.325	-0.239
Test-Taking Strategies	29	73	44	53	50	48.83	10.646	113.333	1.537	0.022	-0.583
Time Management/ Organizational Techniques	25	62	37	47	47	45.75	8.337	69.511	1.203	-0.247	-0.171
Low Academic Motivation	27	74	47	49	49	51.48	10.531	110.893	1.520	0.206	-0.148
Test Anxiety	27	77	50	48 49 57 62 66	51.50	52.94	11.235	126.230	1.622	0.196	-0.282
Concentration/ Attention Difficulties	28	76	48	50	52	53.04	10.935	119.573	1.578	0.213	-0.119

Inspection of the frequency tables (see Appendix Tables A12a through A12i) and visual inspection of the distributions (see Appendix Figures B12a through B12i) shows that the Study Strategies scale starts with a short tail, the majority of scores fall between 39 and 56, the distribution peaks above the mean, and ends with a short tail. The distribution for the Note Taking/Listening Skills scale starts with a short tail, the majority of scores fall between 36 and

58, the distribution peaks below and at the mean, and ends with a short tail. The distribution for the Reading/Comprehension Strategies scale starts with a short tail, the majority of scores fall between 41 and 59, the distribution peaks above the mean, and ends with a shorter tail. The distribution for the Writing/Research Skills scale starts with a short tail, the majority of scores fall between 42 and 61, the distribution peaks once below and twice above the mean, and ends with a short but slightly taller tail. The distribution for the Test-Taking Strategies scale starts with a short tail, the majority of scores fall between 37 and 59, the distribution peaks above the mean, and ends with a shorter tail. The distribution for the Time Management/Organizational Techniques scale starts with a short tail, the majority of scores fall between 38 and 55, the distribution peaks above the mean, and ends with a short but slightly taller tail. The distribution for the Low Academic Motivation scale starts with a short tail, the majority of scores fall between 43 and 63, the distribution peaks below the mean, and ends with a short but slightly taller tail. The distribution for the Test Anxiety scale starts with a short tail, the majority of scores fall between 42 and 65, the distribution peaks below and above the mean, and ends with a short but slightly taller tail. The distribution for the Concentration/Attention Difficulties scale starts with a short tail, the majority of scores fall between 42 and 64, the distribution peaks below the mean, and ends with a short but slightly taller tail.

Descriptive statistics for the AIMSWeb Winter Benchmarks are displayed in Tables 32 through 34. Norms for the AIMSWeb Computation Winter Benchmark are available for a national, state, and local normative sample. The 2009-2010 school year was the first year that the AIMSWeb Concepts and Applications Winter Benchmark was available for use. For this reason, only local norms are available while Pearson, the publisher of the AIMSWeb Winter Benchmarks, uses the results from students who were administered the Concepts and

Applications Benchmarks during the 2009-2010 school year for developing state and national norms. The local norms were used when interpreting both the AIMSWeb Computation and the AIMSWeb Concepts and Applications Winter Benchmarks. The local norms were considered appropriate based on the fact that in recent years the local norms for the Galena Park Independent School District have been aligned with the national norms.

Table 32 displays the descriptive statistics for the study participants enrolled in the Third Grade who completed the AIMSWeb Winter Benchmarks. The Normal Curve Equivalent scores for the Computation probe range from 1 to 99 (M = 47.52, SD = 23.835), with higher scores indicating a higher developed skill level in mathematics as measured by procedural fluency, the skill of carrying out basic mathematical procedures flexibly, accurately, efficiently, and appropriately. The Normal Curve Equivalent scores for the Concepts and Applications probe range from 1 to 99 (M = 43.87, SD = 23.675), with higher scores indicating a higher developed skill level in mathematics as measured by general problem solving skills expected of students enrolled in the Third Grade.

Table 32
AIMSWeb Descriptive Statistics, Third Graders (n=57)

Benchmark	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Computation	1	99	98	19	50.50	47.52	23.835	568.118	3.077	-0.249	-0.389
Concepts and Applications	1	99	98	32 45	45	43.87	23.675	560.524	3.056	0.029	-0.365

Inspection of the frequency tables (see Appendix Tables A13a through A13b) and visual inspection of the distributions (see Appendix Figures B13a through B13b) shows that the distribution starts with a short tail, the majority of scores fall between 19 and 69, the distribution peaks below the mean, and ends with a short tail. The distribution for the AIMSWeb Concepts and Application Winter Benchmark starts with a short tail, the majority of the scores fall between 24 and 68, the distribution peaks twice below the mean, and ends with a short tail.

Table 33 displays the descriptive statistics for the study participants enrolled in the Fourth Grade who completed the AIMSWeb Winter Benchmarks. The Normal Curve Equivalent scores for the Computation probe range from 7 to 99 (*M* = 48.71, *SD* = 22.502). The Normal Curve Equivalent scores for the Concepts and Applications probe range from 1 to 99 (*M* = 49.47, *SD* = 23.714).

Table 33
AIMSWeb Descriptive Statistics, Fourth Graders (n=67)

Benchmark	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Computation	7	99	92	53	47	48.71	22.502	506.330	2.729	0.150	-0.307
Concepts and Applications	1	99	98	41	52	49.47	23.714	562.342	2.876	-0.211	-0.332

Inspection of the frequency tables (see Appendix Tables A13c through A13d) and visual inspection of the distributions (see Appendix Figures B13c through B13d)shows that the distribution starts with a short tail, the majority of scores fall between 29 and 71, the distribution peaks above the mean, and ends with a short but slightly taller tail. The distribution for the AIMSWeb Concepts and Application Winter Benchmark starts with a short tail, the majority of the scores fall between 24 and 72, the distribution peaks below the mean, and ends with a short tail.

Table 34 displays the descriptive statistics for the study participants enrolled in the Fifth Grade who completed the AIMSWeb Winter Benchmarks. The Normal Curve Equivalent scores for the Computation probe range from 19 to 99 (*M* = 47.60, *SD* = 22.637). The Normal Curve Equivalent scores for the Concepts and Applications probe range from 19 to 99 (*M* = 47.94, *SD* = 23.920).

Table 34
AIMSWeb Descriptive Statistics, Fifth Graders (n=45)

Benchmark	Min Score	Max Score	Range	Mode	Median	Mean	Standard Deviation	Variance	Standard Error	Skewness	Kurtosis
Computation	19	99	80	45	45	47.60	22.637	512.414	3.267	0.060	0.102
Concepts and Applications	19	99	80	42	42	47.94	23.920	572.188	3.453	0.105	-0.242

Inspection of the frequency tables (see Appendix Tables A13e through A13f) and visual inspection of the distributions (see Appendix Figures B13e through B13f) shows that the distribution for the AIMSWeb Computation Winter Benchmark starts with a short tail, the majority of scores fall between 26 and 69, the distribution peaks below the mean, and ends with a short tail. The distribution for the AIMSWeb Concepts and Applications Winter Benchmark starts with a tall tail, the majority of the scores fall between 27 and 77, the distribution peaks below the mean, and ends with a short tail.

Descriptive statistics for the April 2010 administration of the TAKS Math test are displayed by grade level in Table 35. The standard scores for the Third Grade TAKS Math test range from 515 to 788 (*M* = 605.44, *SD* = 68.383), with higher scores indicating a higher level of mastery of the Third Grade Texas Essential Knowledge and Skills in mathematics. Inspection of the frequency tables (see Appendix Table A14a) and visual inspection of the distributions (see Appendix Figure B14a) shows that the distribution starts with a tall tail, the majority of scores fall between 545 and 669, the distribution peaks three times above the mean, and ends with a short tail and two extremely high scores that are outliers.

The standard scores for the Fourth Grade TAKS Math test range from 567 to 842 (*M* = 673.45, *SD* = 76.113), with higher scores indicating a higher level of mastery of the Fourth Grade Texas Essential Knowledge and Skills in mathematics. Inspection of the frequency tables (see Appendix Table A14b) and visual inspection of the distributions (see Appendix Figure 14b) shows that the distribution starts with a short tail, the majority of scores fall between 603 and 774, the distribution peaks twice above the mean, and ends with a tall tail.

The standard scores for the Fifth Grade TAKS Math test range from 515 to 893 (*M* = 695.13, *SD* = 99.679), with higher scores indicating a higher level of mastery of the Fifth Grade Texas Essential Knowledge and Skills in mathematics. Inspection of the frequency tables (see Appendix Table A14c) and visual inspection of the distributions (see Appendix Figure B14c) shows that the distribution starts with a short tail, the majority of scores fall between 606 and 775, the distribution peaks once below and three times above the mean, and ends with a tall tail.

Table 35
TAKS Math Descriptive Statistics by Grade Level

Grade Level	**Min Score**	**Max Score**	**Range**	**Mode**	**Median**	**Mean**	**Standard Deviation**	**Variance**	**Standard Error**	**Skewness**	**Kurtosis**
Third Grade (n=50)	515	788	273	582 640 669	598	605.44	68.383	4676.251	9.671	0.863	0.469
Fourth Grade (n=65)	567	842	275	672 724	672	673.45	76.113	5793.126	9.441	0.718	-0.238
Fifth Grade (n=46)	515	893	377	621 738 775 893	684.50	695.13	99.679	9935.938	14.697	0.345	-0.421

Reliability

Reliability coefficients for the scores on each measure used in this study were computed. Reliability coefficients ensure that scores are consistent and were not the result of random fluctuations, ensuring that the results of a study are not compromised. Poor reliability compromises the ability of scores to measure intended constructs and the ability of the study to yield noteworthy observed effects. For this reason, it is considered good practice for researchers to include information about the reliability of one's own scores when writing up the results of a study (Thompson, 2003). In general, coefficients of 0.6 to 0.7 are considered acceptable levels of reliability, while coefficients of 0.8 or higher indicate good reliability (Revelle & Zinbarg, 2009). Low reliability coefficients occur for one of two reasons. First, obtained scores may be imprecise, resulting in a large value for the standard error of measurement. Second, obtained scores have a limited amount of variance, resulting in a small value for the standard deviation. Conversely, higher reliability coefficients are the result of good precision of scores, as indicated by a low standard error of measurement, and wider variability of test scores, as indicated by a large standard deviation (Benson, 1998; Boyle, 1991). High coefficients of reliability are not always desirable. Scores that are too consistent become meaningless if they provide little or no unique information (Cortina, 1993; Schmitt, 1996).

Tables 36 through 39 display the internal consistency reliability or Cronbach's coefficient alpha coefficients for the sample data used in this study. Appendix Tables D1 through D5 display reliability information obtained from the Examiner's Manual for the measures used in this study. Table 36 displays the reliability coefficients for the math subtests of the Woodcock-Johnson III Tests of Achievement. Reliability coefficients for the Calculation subtest range from 0.699 to 0.840. Reliability coefficients for the Math Fluency subtest range from 0.964 to 0.976.

Reliability coefficients for the Applied Problems subtest range from 0.846 to 0.896. Reliability coefficients for the first portion of the Quantitative Concepts subtest range from 0.514 to 0.770. Reliability coefficients for the second portion of the Quantitative Concepts subtest range from 0.459 to 0.716.

Table 36
Internal Consistency Reliability, WJ-III Tests of Achievement

WJ-III Subtest	Full Sample	Female	Male	Third Grade	Fourth Grade	Fifth Grade
Calculation	0.816	0.791	0.833	0.785	0.699	0.840
Math Fluency	0.975	0.973	0.976	0.964	0.973	0.972
Applied Problems	0.891	0.896	0.886	0.883	0.846	0.877
Quantitative Concepts A	0.763	0.770	0.757	0.756	0.514	0.717
Quantitative Concepts B	0.692	0.669	0.716	0.711	0.459	0.705

Table 37 displays the reliability coefficients for the School Motivation and Learning Strategies Inventory (SMALSI). Reliability coefficients for the Study Strategies scale range from 0.707 to 0.772. Reliability coefficients for the Note Taking/Listening Skills scale range from 0.765 to 0.815. Reliability coefficients for the Reading/Comprehension Strategies scale range from 0.698 to 0.817. Reliability coefficients for the Writing/Research Skills scale range from 0.645 to 0.783. Reliability coefficients for the Test-Taking Strategies scale range from 0.773 to 0.811. Reliability coefficients for the Time Management/Organizational Techniques scale range from 0.626 to 0.801. Reliability coefficients for the Low Academic Motivation scale range from 0.845 to 0.887. Reliability coefficients for the Test Anxiety scale range from 0.845

to 0.912. Reliability coefficients for the Concentration/Attention Difficulties scale range from 0.835 to 0.930.

Table 37
Internal Consistency Reliability, SMALSI

SMALSI Scale	Full Sample	Female	Male	Third Grade	Fourth Grade	Fifth Grade
Study Strategies	0.744	0.751	0.711	0.765	0.707	0.772
Note Taking/ Listening Skills	0.796	0.765	0.802	0.815	0.788	0.789
Reading/ Comprehension Strategies	0.771	0.780	0.698	0.774	0.739	0.817
Writing/ Research Skills	0.729	0.772	0.645	0.702	0.783	0.664
Test-Taking Strategies	0.791	0.773	0.784	0.789	0.811	0.778
Time Management/ Organizational Techniques	0.748	0.789	0.626	0.668	0.801	0.656
Low Academic Motivation	0.866	0.862	0.873	0.845	0.887	0.869
Test Anxiety	0.889	0.883	0.893	0.845	0.891	0.912
Concentration/ Attention Difficulties	0.904	0.905	0.902	0.835	0.930	0.904

Another way of measuring consistency in responding on the SMALSI is the Inconsistent Responding Index. The Inconsistent Responding Index was developed using fourteen pairs of items that were found to be highly correlated in the standardization sample. The Inconsistent Responding Index score is calculated by counting the number of pairs for which responses differ by two points or more. For the standardization sample, the average Inconsistent Responding Index score was 2.04 (*SD* = 1.78). For the sample used in this study, the average Inconsistent Responding Index score was 2.24 (*SD* = 1.846).

Table 38 displays the reliability coefficients for the AIMSWeb Winter Benchmarks. Reliability coefficients for the Third Grade Computation and Concepts and Applications Winter Benchmarks are 0.859 and 0.761 respectively. Reliability coefficients for the Fourth Grade Computation and Concepts and Applications Winter Benchmarks are 0.970 and 0.640. Reliability coefficients for the Fifth Grade Computation and Concepts and Applications Winter Benchmarks are 0.858 and 0.643.

Table 38
Internal Consistency Reliability, AIMSWeb Winter Benchmarks

AIMSWeb Winter Benchmarks	Third Grade	Fourth Grade	Fifth Grade
Computation	0.859	0.970	0.858
Concepts and Applications	0.761	0.640	0.643

Table 39 displays the reliability coefficients for the TAKS Math Tests. The reliability coefficient for the Third Grade TAKS Math is 0.647. The reliability coefficient for the Fourth Grade TAKS Math is 0.701. The reliability coefficient for the Fifth Grade TAKS Math is 0.898.

Table 39
Internal Consistency Reliability, TAKS Math Test

Grade Level	**Alpha**
Third Grade	0.647
Fourth Grade	0.701
Fifth Grade	0.898

Inferential Statistics

The remainder of the chapter reports the inferential statistics used to answer the research questions for this study. Confidence intervals at the 95% level were calculated and reported for the means, Pearson r correlation coefficients, *a* (Constant) values, unstandardized *B* values, and standardized Beta, or β, weights. The reporting of confidence intervals is strongly recommended in psychology research (Americal Psychological Association, 2009). Confidence intervals can be used to evaluate how obtained results are consistent with results in the literature that replicate all or a portion of the research study (Kline, 2004; Thompson, 2006). The remainder of the chapter is organized around the nine research questions. The statistics used to answer each question are reported with a brief explanation and are displayed in tables where appropriate.

Question One

1.) **What is the relationship between scores on the Study Strategies, Note Taking/ Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the math cluster scores of the WJ-III?**

According to the hypothesis for Question 1, the researcher proposed that there would be a positive relationship between study strategies and broad math achievement, note taking and listening skills and broad math achievement, test-taking strategies and broad math achievement, and time management and organizational techniques and broad math achievement. There would be a positive relationship between study strategies and brief math achievement, note taking and listening skills and brief math achievement, test-taking strategies and brief math achievement, and time management and organizational techniques and brief math achievement. There would be a positive relationship between study strategies and math calculation skills, note taking and listening skills and math calculation skills, test-taking strategies and math calculation skills, and time management and organizational techniques and math calculation skills. There would be a positive relationship between study strategies and math reasoning skills, note taking and listening skills and math reasoning skills, test-taking strategies and math reasoning skills, and time management and organizational techniques and math reasoning skills.

Question 1 was answered using the Pearson *r* correlation coefficient and linear regression. First, Pearson *r* coefficients were calculated using the scores for each scale of the SMALSI as predictor variables and the scores for each math cluster of the WJ-III as a criterion variable. The coefficient of determinism, r squared or r^2, was calculated to determine how much variability within each math cluster was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which scores on each scale of the SMALSI can be used to predict scores for each math cluster of the WJ-III. To correct for any experiment-wise Type I error, the alpha level used for the Pearson r and linear regression values was 0.01.

Full Sample

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the full sample of participants on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/ Organizational

Techniques scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 40.

Table 40
Means for the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques Scales of the SMALSI and the WJ-III Math Clusters, Full Sample (n=176)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Study Strategies	48.68	10.555	47.119	50.240	Broad Math	99.22	14.761	97.038	101.401
Note Taking/ Listening Skills	48.16	10.583	46.595	49.724	Brief Math	98.57	14.515	96.425	100.714
Test Taking Strategies	50.95	11.276	49.284	52.616	Math Calculation Skills	99.86	14.665	97.694	102.026
Time Management/ Organizational Techniques	47.64	9.925	46.173	49.106	Math Reasoning	98.78	13.420	96.796	100.764

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Study Strategies, Note Taking/Listening Skills, Time Management/ Organizational Techniques, and Test-Taking Strategies scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 41. Scatterplots for these correlations are displayed in Appendix Figures C1a, C1b, C1e, and C1f. For the full sample of participants, results show a positive correlation between study strategies and broad math achievement

($r = 0.043$, $p = 0.569$). Study strategies explain 0.2% of the variability in broad math achievement. A linear regression was used to determine if study strategies could predict broad math achievement. As study strategies increased, broad math achievement increased ($a = 96.276$, 95% CI [85.865, 106.688], $B = 0.061$, 95% CI [-0.149, 0.270], $\beta = 0.043$, 95% CI [-0.147, 0.269]). The overall model was not statistically significant, $F(1, 174) = 0.326$, $p = 0.569$.

Results show a positive correlation between note taking and listening skills and broad math achievement ($r = 0.084$, $p = 0.268$). Note taking and listening skills explain 0.7% of the variability in broad math achievement. A linear regression was used to determine if note taking and listening skills could predict broad math achievement. As note taking and listening skills increased, broad math achievement increased ($a = 93.580$, 95% CI [83.325, 103.835], $B = 0.117$, 95% CI [-0.091, 0.325], $\beta = 0.084$, 95% CI [-0.065, 0.233]). The overall model was not statistically significant, $F(1, 174) = 1.236$, $p = 0.268$.

Results show a positive relationship between test-taking strategies and broad math achievement ($r = 0.138$, $p = 0.068$). Test-taking strategies explain 1.9% of the variability in broad math achievement. A linear regression was used to determine if test taking strategies could predict broad math achievement. As test-taking strategies increased, broad math achievement increased ($a = 90.019$, 95% CI [79.897, 100.141], $B = 0.181$, 95% CI [-0.013, 0.375], $\beta = 0.138$, 95% CI [-0.009, 0.285]). The overall model was not statistically significant, $F(1, 174) = 3.377$, $p = 0.068$.

Results show a positive relationship between time management and organizational techniques and broad math achievement ($r = 0.109$, $p = 0.151$). Time management and organizational techniques explain 1.2% of the variability in broad math achievement. A linear regression was used to determine if time management and organizational techniques could predict broad math achievement. As time management and organizational skills increased, broad math achievement increased (*a* = 91.525, 95% CI [80.760, 102.289], *B* = 0.162, 95% CI [-0.060, 0.383], β = 0.109, 95% CI [-0.038, 0.256]). The overall model was not statistically significant, $F(1,174) = 2.078$, $p = 0.151$.

Table 41
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Broad Math, Full Sample

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	0.043	-0.082	0.167	0.569	0.002
Note Taking/ Listening Skills	0.084	-0.065	0.229	0.268	0.007
Test-Taking Strategies	0.138	-0.010	0.280	0.068	0.019
Time Management/ Organizational Techniques	0.109	-0.040	0.253	0.151	0.012

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 42. Scatterplots for these correlations are displayed in Appendix Figures C2a, C2b, C2e, and C2f. For the full sample, results show a positive correlation between study strategies and brief math achievement ($r = 0.026$, $p = 0.728$). Study strategies explain 0.1% of the variability in brief math achievement. A linear regression was used to determine if study strategies could predict brief math achievement. As study strategies increased, brief math achievement increased ($a = 96.804$, 95% CI [86.561, 107.048], $B = 0.036$, 95% CI [-0.169, 0.242], $\beta = 0.026$, 95% CI [-0.123, 0.175]). The overall model was not statistically significant, $F(1, 174) = 0.122$, $p = 0.728$.

Results show a positive correlation between note taking and listening skills and brief math achievement ($r = 0.070$, $p = 0.358$). Note taking and listening skills explain 0.5% of the variability in brief math achievement. A linear regression was used to determine if note taking and listening skills could predict brief math achievement. As note taking and listening skills increased, brief math achievement increased ($a = 93.967$, 95% CI [83.873, 104.062], $B = 0.096$, 95% CI [-0.109, 0.300], $\beta = 0.070$, 95% CI [-0.079, 0.219]). The overall model was not statistically significant, $F(1, 174) = 0.850$, $p = 0.358$.

Results show a positive relationship between test-taking strategies and brief math achievement ($r = 0.123$, $p = 0.104$). Test-taking strategies explain 1.5% of the variability in brief math achievement. A linear regression was used to determine if test-taking strategies could predict brief math achievement. As test-taking strategies increased, general math achievement increased ($a = 90.507$, 95% CI [80.534, 100.480], $B = 0.158$, 95% CI [-0.033, 0.349], $\beta = 0.123$, 95% CI [-0.024, 0.270]). The overall model was not statistically significant, $F(1, 174) = 2.673$, $p = 0.104$.

Results show a positive relationship between time management and organizational techniques and brief math achievement ($r = 0.083$, $p = 0.275$). Time management and organizational techniques explain 0.7% of the variability in brief math achievement. A linear regression was used to determine if time management and organizational techniques could predict brief math achievement. As time management and organizational techniques increased, brief math achievement increased (*a* = 92.806, 95% CI [82.194, 103.417], *B* = 0.121, 95% CI [-0.097, 0.339], β = 0.083, 95% CI [-0.066, 0.232]). The overall model was not statistically significant, $F(1, 174) = 1.201$, $p = 0.275$.

Table 42
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Brief Math, Full Sample

SMALSI Scale	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	0.026	-0.122	0.173	0.728	0.001
Note Taking/ Listening Skills	0.070	-0.079	0.216	0.358	0.005
Test-Taking Strategies	0.123	-0.025	0.266	0.104	0.015
Time Management/ Organizational Techniques	0.083	-0.066	0.228	0.275	0.007

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 43. Scatterplots for these correlations are displayed in Appendix Figures C3a, C3b, C3e, and C3f. For the full sample, results show a positive correlation between study strategies and math calculation skills ($r = 0.094$, $p = 0.214$). Study strategies explain 0.9% of the variability in math calculation skills. A linear regression was used to determine if study strategies could predict math calculation skills. As study strategies increased, math calculation skills increased ($a = 93.494$, 95% CI [83.187, 103.801], $B = 0.131$, 95% CI [-0.076, 0.338], $\beta = 0.094$, 95% CI [-0.053, 0.241]). The overall model was not statistically significant, $F(1, 174) = 1.557$, $p = 0.214$.

Results show a positive correlation between note taking and listening skills and math calculation skills ($r = 0.139$, $p = 0.065$). Note taking and listening skills explain 1.9% of the variability in math calculation skills. A linear regression was used to determine if note taking and listening skills could predict math calculation skills. As note taking and listening skills increased, math calculation skills increased ($a = 90.569$, 95% CI [80.445, 100.693], $B = 0.193$, 95% CI [-0.012, 0.398], $\beta = 0.139$, 95% CI [-0.008, 0.286]). The overall model was not statistically significant, $F(1, 174) = 3.441$, $p = 0.065$.

Results show a positive relationship between test-taking strategies and math calculation skills ($r = 0.153$, $p = 0.042$). Test-taking strategies explain 2.3% of the variability in math calculation skills. A linear regression was used to determine if test-taking strategies could predict math calculation skills. As test-taking strategies increased, math calculation skills increased ($a = 89.700$, 95% CI [79.667, 99.733], $B = 0.199$, 95% CI [0.007, 0.392], $\beta = 0.153$, 95% CI [0.006, 0.300]). The overall model was not statistically significant, $F(1, 174) = 4.193$, $p = 0.042$.

Results show a positive relationship between time management and organizational techniques and math calculation skills ($r = 0.145$, $p = 0.055$). Time management and organizational techniques explain 2.1% of the variability in math calculation skills. A linear regression was used to determine if time management and organizational techniques could predict math calculation skills. As time management and organizational techniques increased, math calculation skills increased (a = 89.656, 95% CI [79.012, 100.300], B = 0.214, 95% CI [-0.004, 0.433], β = 0.145, 95% CI [-0.002, 0.292]). The overall model was not statistically significant, $F(1, 174) = 3.737$, $p = 0.055$.

Table 43

Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Calculation Skills, Full Sample

SMALSI Scale	Math Calculation Skills	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	0.094	-0.055	0.239	0.214	0.009
Note Taking/ Listening Skills	0.139	-0.009	0.281	0.065	0.019
Test-Taking Strategies	0.153	0.005	0.294	0.042	0.023
Time Management/ Organizational Techniques	0.145	-0.003	0.287	0.055	0.021

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 44. Scatterplots for these correlations are displayed in Appendix Figures C4a, C4b, C4e, and C4f. For the full sample, results show there is no correlation between study strategies and math reasoning skills ($r < 0.001$, $p = 0.995$). Study strategies explain <0.1% of the variability in math reasoning skills. A linear regression was used to determine if study strategies could predict math reasoning skills. As study strategies increased, math reasoning did not move in a consistent direction ($a = 98.815$, 95% CI [89.341, 108.289], $B = 0.000$, 95% CI [-0.191, 0.190], $\beta = 0.000$, 95% CI [-0.149, 0.149]). The overall model was not statistically significant, $F(1, 174) = 0.000$, $p = 0.995$.

Results show a positive correlation between note taking and listening skills and math reasoning skills ($r = 0.069$, $p = 0.365$). Note taking and listening skills explain 0.5% of the variability in math reasoning skills. A linear regression was used to determine if note taking and listening skills could predict math reasoning skills. As note taking and listening skills increased, math reasoning skills increased ($a = 94.586$, 95% CI [85.252, 103.919], $B = 0.087$, 95% CI [-0.102, 0.276], $\beta = 0.069$, 95% CI [-0.079, 0.218]). The overall model was not statistically significant, $F(1, 174) = 0.826$, $p = 0.365$.

Results show a positive relationship between test-taking strategies and math reasoning skills ($r = 0.148$, $p = 0.050$). Test-taking strategies explain 2.2% of the variability in math reasoning skills. A linear regression was used to determine if test-taking strategies could predict math reasoning skills. As test-taking strategies increased, math reasoning skills increased ($a = 89.797$, 95% CI [80.608, 98.985], $B = 0.176$, 95% CI [0.000, 0.353], $\beta = 0.148$, 95% CI [0.001, 0.295]). The overall model was not statistically significant, $F(1, 174) = 3.909$, $p = 0.050$.

Results show a positive relationship between time management and organizational techniques and math reasoning skills ($r = 0.079$, $p = 0.296$). Time management and organizational techniques explain 0.6% of the variability in math reasoning skills. A linear regression was used to determine if time management and organizational techniques could predict math reasoning skills. As time management and organizational techniques increased, math reasoning skills increased (a = 93.864, 95% CI [83.871, 103.497], B = 0.107, 95% CI [-0.095, 0.309], β = 0.079, 95% CI [-0.069, 0.228]). The overall model was not statistically significant, $F(1, 174) = 1.098$, $p = 0.296$.

Table 44
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Reasoning, Full Sample

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	<0.001	-0.148	0.148	0.995	<0.001
Note Taking/ Listening Skills	0.069	-0.080	0.215	0.365	0.005
Test-Taking Strategies	0.148	0.000	0.290	0.050	0.022
Time Management/ Organizational Techniques	0.079	-0.070	0.224	0.296	0.006

Third Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Third Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/ Organizational Techniques scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 45.

Table 45
Means for the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques Scales of the SMALSI and the WJ-III Math Clusters, Third Graders (n=60)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Study Strategies	48.83	11.104	46.021	51.637	Broad Math	98.22	17.862	93.700	102.739
Note Taking/ Listening Skills	48.70	11.159	45.875	51.524	Brief Math	97.93	17.727	93.445	102.415
Test Taking Strategies	51.48	11.223	48.639	54.320	Math Calculation Skills	101.07	16.679	96.850	105.289
Time Management/ Organizational Techniques	45.83	9.370	43.458	48.202	Math Reasoning	97.87	15.387	93.977	101.763

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 46. Scatterplots for these correlations are displayed in Appendix Figures C5a, C5b, C5e, and C5f. For participants in the Third Grade, results show a negative correlation between study strategies and broad math achievement (r = -0.076, p = 0.565). Study strategies explain 0.6% of the variability in broad math achievement. A linear regression was used to determine if study strategies could predict broad math achievement. As study strategies increased, broad math achievement decreased (a = 104.170, 95% CI [83.065, 125.275], *B* = -0.122, 95% CI [-0.544, 0.300], β = -0.076, 95% CI [-0.332, 0.181]). The overall model was not statistically significant, $F(1, 58) = 0.335$, $p = 0.565$.

Results show a negative correlation between note taking and listening skills and broad math achievement ($r = -0.004$, $p = 0.973$). Note taking and listening skills explain <0.1% of the variability in broad math achievement. A linear regression was used to determine if note taking and listening skills could predict broad math achievement. As note taking and listening skills increased, broad math achievement decreased (*a* = 98.562, 95% CI [77.550, 119.574], *B* = -0.007, 95% CI [-0.428, 0.414], β = -0.004, 95% CI[-0.260, 0.253]). The overall model was not statistically significant, $F(1, 58) = 0.001$, $p = 0.973$.

Results show a positive relationship between test-taking strategies and broad math achievement ($r = 0.082$, $p = 0.534$). Test-taking strategies explain 0.7% of the variability in broad math achievement. A linear regression was used to determine if test-taking strategies could predict broad math achievement. As test-taking strategies increased, broad math achievement increased (*a* = 91.505, 95% CI [69.545, 113.466], *B* = 0.130, 95% CI [-0.287, 0.547], β = 0.082, 95% CI [-0.174, 0.339]). The overall model was not statistically significant, $F(1, 58) = 0.392$, $p = 0.534$.

Results show a positive relationship between time management and organizational techniques and broad math achievement ($r = 0.037$, $p = 0.781$). Time management and organizational techniques explain 0.1% of the variability in broad math achievement. A linear regression was used to determine if time management and organizational techniques could predict broad math achievement. As time management and organizational techniques increased, broad math achievement increased (*a* = 95.021, 95% CI [71.606, 118.437], *B* = 0.070, 95% CI

[-0.431, 0.570], β = 0.037, 95% CI [-0.219, 0.294]). The overall model was not statistically significant, $F(1, 58) = 0.078$, $p = 0.781$.

Table 46

Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Broad Math, Third Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.076	-0.324	0.181	0.565	0.006
Note Taking/ Listening Skills	-0.004	-0.258	0.250	0.973	<0.001
Test-Taking Strategies	0.082	-0.176	0.329	0.534	0.007
Time Management/ Organizational Techniques	0.037	-0.219	0.288	0.781	0.001

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 47. Scatterplots for these correlations are displayed in Appendix Figures C6a, C6b, C6e, and C6f. For participants in the Third Grade, results show a negative correlation between study strategies and brief math achievement ($r = -0.091$, $p = 0.490$). Study strategies explain 0.8% of the variability in brief math achievement. A linear regression was used to determine if study strategies could predict brief math achievement. As study strategies increased, brief math achievement decreased (a = 105.013, 95% CI [84.095, 125.932], B = -0.145, 95% CI [-0.563, 0.273], β = -0.091, 95% CI [-0.347, 0.166]). The overall model was not statistically significant, $F(1,58) = 0.482$, $p = 0.490$.

Results show a negative correlation between note taking and listening skills and brief math achievement (r = -0.019, p = 0.887). Note taking and listening skills explain <0.1% of the variability in brief math achievement. A linear regression was used to determine if note taking and listening skills could predict brief math achievement. As note taking and listening skills increased, brief math achievement decreased (a = 99.830, 95% CI [78.531, 120.229], B = -0.030, 95% CI [-0.447, 0.388], β = -0.019, 95% CI [-0.275, 0.238]). The overall model was not statistically significant, $F(1, 58) = 0.020$, $p = 0.887$.

Results show a negative relationship between test-taking strategies and brief math achievement (r = 0.047, p = 0.724). Test-taking strategies explain 0.2% of the variability in brief math achievement. A linear regression was used to determine if test-taking strategies could predict brief math achievement. As test-taking strategies increased, brief math achievement increased (a = 94.151, 95% CI [72.307, 115.995], B = 0.073, 95% CI [-0.341, 0.488], β = 0.047, 95% CI [-0.209, 0.304]). The overall model did not prove significant, $F(1, 58) = 0.126$, $p = 0.724$.

Results show a positive relationship between time management and organizational techniques and brief math achievement (r = 0.006, p = 0.965). Time management and organizational techniques explain <0.1% of the variability in brief math achievement. A linear regression was used to determine if time management and organizational techniques could predict brief math achievement. As time management and organizational techniques increased, brief math achievement increased (*a* = 97.426, 95% CI [74.173, 120.679], *B* = 0.011, 95% CI [-0.486, 0.508], β = 0.006, 95% CI [-0.250, 0.263]). The overall model was not statistically significant, $F(1, 58) = 0.002$, $p = 0.965$.

Table 47
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Brief Math, Third Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r²**
		Lower	**Upper**		
Study Strategies	-0.091	-0.337	0.167	0.490	0.008
Note Taking/ Listening Skills	-0.019	-0.272	0.236	0.887	<0.001
Test-Taking Strategies	0.047	-0.209	0.297	0.724	0.002
Time Management/ Organizational Techniques	0.006	-0.248	0.260	0.965	<0.001

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 48. Scatterplots for these correlations are displayed in Appendix Figures C7a, C7b, C7e, and C7f. For participants in the Third Grade, results show a negative correlation between study strategies and math calculation skills ($r = -0.012$, $p = 0.930$).

Study strategies explain <0.1% of the variability in math calculation skills. A linear regression was used to determine if study strategies could predict math calculation skills. As study strategies increased, math calculation skills decreased (*a* = 101.921, 95% CI [82.159, 121.684], *B* = -0.018, 95% CI [-0.412, 0.377], β = -0.012, 95% CI [-0.268, 0.245]). The overall model was not statistically significant, $F(1, 58) = 0.008$, $p = 0.930$.

Results show a positive correlation between note taking and listening skills and math calculation skills ($r = 0.107$, $p = 0.416$). Note taking and listening skills explain 1.1% of the variability in math calculation skills. A linear regression was used to determine if note taking and listening skills could predict math calculation skills. As note taking and listening skills increased, math calculation skills increased (*a* = 93.823, 95% CI [73.775, 112.791], *B* = 0.160, 95% CI [-0.231, 0.550], β = 0.107, 95% CI [-0.149, 0.364]). The overall model was not statistically significant, $F(1, 58) = 0.671$, $p = 0.416$.

Results show a positive relationship between test-taking strategies and math calculation skills ($r = 0.163$, $p = 0.214$). Test-taking strategies explain 2.7% of the variability in math calculation skills. A linear regression was used to determine if test-taking strategies could predict math calculation skills. As test-taking strategies increased, math calculation skills increased (*a* = 88.609, 95% CI [68.308, 108.910], *B* = 0.242, 95% CI [-0.143, 0.627], β = 0.163, 95% CI [-0.091, 0.418]). The overall model was not statistically significant, $F(1, 58) = 1.579$, $p = 0.214$.

Results show a positive relationship between time management and organizational techniques and math calculation skills ($r = 0.111$, $p = 0.399$). Time management and organizational techniques explain 1.2% of the variability in math calculation skills. A linear regression was used to determine if time management and organizational techniques could predict math calculation skills. As time management and organizational techniques increased, math calculation skills increased (a = 92.019, 95% CI [70.274, 113.673], B = 0.197, 95% CI [-0.268, 0.662], β = 0.111, 95% CI [-0.143, 0.366]). The overall model was not statistically significant, $F(1, 58) = 0.722$, $p = 0.399$.

Table 48
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Calculation Skills, Third Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.012	-0.265	0.243	0.930	<0.001
Note Taking/ Listening Skills	0.107	-0.151	0.351	0.416	0.011
Test-Taking Strategies	0.163	-0.095	0.400	0.214	0.027
Time Management/ Organizational Techniques	0.111	-0.147	0.355	0.399	0.012

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 49. Scatterplots for these correlations are displayed in Appendix Figures C8a, C8b, C8e, and C8f. For participants in the Third Grade, results show a negative correlation between study strategies and math reasoning skills ($r = -0.106$, $p = 0.422$). Study strategies explain 1.1% of the variability in math reasoning skills. A linear regression was used to determine if study strategies could predict math reasoning skills. As study strategies increased, math reasoning skills decreased ($a = 105.012$, 95% CI [86.881, 123.143], $B = -0.146$, 95% CI [-0.509, 0.216], $\beta = -0.106$, 95% CI [-0.362, .151]). The overall model was not statistically significant, $F(1, 58) = 0.654$, $p = 0.422$.

Results show a negative correlation between note taking and listening skills and math reasoning skills ($r = -0.050$, $p = 0.706$). Note taking and listening skills explain 0.2% of the variability in math reasoning skills. A linear regression was used to determine if note taking and listening skills could predict math reasoning skills. As note taking and listening skills increased, math reasoning skills decreased ($a = 101.210$, 95% CI [83.132, 119.288], $B = -0.069$, 95% CI [-0.431, 0.293], $\beta = -0.050$, 95% CI [-0.306, 0.207]). The overall model was not statistically significant, $F(1, 58) = 0.144$, $p = 0.706$.

Results show a positive relationship between test-taking strategies and math reasoning skills ($r = 0.063$, $p = 0.632$). Test-taking strategies explain 0.4% of the variability in math reasoning skills. A linear regression was used to determine if test-taking strategies could predict math reasoning skills. As test-taking strategies increased, math reasoning skills increased ($a = 93.413$, 95% CI [74.469, 112.356], $B = 0.087$, 95% CI [-0.273, 0.446], $\beta = 0.063$, 95% CI [-0.193, 0.320]). The overall model was not statistically significant, $F(1, 58) = 0.232$, $p = 0.632$.

Results show a positive relationship between time management and organizational techniques and math reasoning skills ($r = 0.013$, $p = 0.924$). Time management and organizational techniques explain <0.1% of the variability in math problem solving and reasoning skills. A linear regression was used to determine if time management and organizational techniques could predict math reasoning skills. As time management and organizational techniques increased, math reasoning skills increased (*a* = 96.923, 95% CI [76.740, 117.106],

B = 0.021, 95% CI [-0.411, 0.452], β = 0.013, 95% CI [-0.243, 0.270]). The overall model was not statistically significant, $F(1, 58) = 0.009$, $p = 0.924$.

Table 49
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Reasoning, Third Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.106	-0.350	0.152	0.422	0.011
Note Taking/ Listening Skills	-0.050	-0.300	0.207	0.706	0.002
Test-Taking Strategies	0.063	-0.194	0.312	0.632	0.004
Time Management/ Organizational Techniques	0.013	-0.242	0.266	0.924	<0.001

Fourth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fourth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/ Organizational Techniques scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 50.

Table 50
Means for the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques Scales of the SMALSI and the WJ-III Math Clusters, Fourth Graders (n=68)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Study Strategies	49.82	10.309	47.370	52.270	Broad Math	98.35	10.792	95.784	100.916
Note Taking/ Listening Skills	48.66	10.810	46.090	51.229	Brief Math	97.24	10.511	94.741	99.739
Test Taking Strategies	51.97	11.712	49.186	54.753	Math Calculation Skills	100.85	10.453	98.364	103.335
Time Management/ Organizational Techniques	50.57	10.816	47.998	53.141	Math Reasoning	98.37	9.922	96.012	100.728

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 51. Scatterplots for these correlations are displayed in Appendix Figures C9a, C9b, C9e, and C9f. For participants in the Fourth Grade, results show a negative correlation between study strategies and broad math achievement (r = -0.108, p = 0.382). Study strategies explain 1.2% of the variability in broad math achievement. A linear regression was used to determine if study strategies could predict broad math achievement. As study strategies increased, broad math achievement decreased (a = 103.971, 95% CI [90.960, 116.981], $B = -0.113$, 95% CI [-0.369, 0.143], $\beta = -0.108$, 95% CI [-0.347, 0.131]). The overall model was not statistically significant, $F(1, 66) = 0.775$, $p = 0.382$.

Results show a positive correlation between note taking and listening skills and broad math achievement ($r = 0.033$, $p = 0.791$). Note taking and listening skills explain 0.1% of the variability in broad math achievement. A linear regression was used to determine if note taking and listening skills could predict broad math achievement. As note taking and listening skills increased, broad math achievement increased ($a = 96.671$, 95% CI [84.541, 108.981], $B = 0.033$, 95% CI [-0.213, 0.278], $\beta = 0.033$, 95% CI [-0.208, 0.274]). The overall model was not statistically significant, $F(1, 66) = 0.071$, $p = 0.791$.

Results show a positive relationship between test-taking strategies and broad math achievement ($r = 0.108$, p = 0.382). Test-taking strategies explain 1.2% of the variability in broad math achievement. A linear regression was used to determine if test-taking strategies could predict broad math achievement. As test-taking strategies increased, broad math achievement increased ($a = 93.197$, 95% CI [81.207, 105.187], $B = 0.099$, 95% CI [-0.126, 0.324], $\beta = 0.108$, 95% CI [-0.131, 0.347]). The overall model was not statistically significant, $F(1, 66) = 0.774$, $p = 0.382$.

Results show a positive relationship between time management and organizational techniques and broad math achievement ($r = 0.073$, $p = 0.555$). Time management and organizational techniques explain 0.5% of the variability in broad math achievement. A linear regression was used to determine if time management and organizational techniques could predict broad math achievement. As time management and organizational techniques increased, broad math achievement increased ($a = 94.674$, 95% CI [82.030, 107.318], $B = 0.073$, 95% CI

[-0.172, 0.317], β = 0.073, 95% CI [-0.168, 0.314]). The overall model was not statistically significant, $F(1, 66) = .353$, $p = 0.555$.

Table 51

Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Broad Math, Fourth Graders

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	-0.108	-0.338	0.134	0.382	0.012
Note Taking/ Listening Skills	0.033	-0.207	0.269	0.791	0.001
Test-Taking Strategies	0.108	-0.134	0.338	0.382	0.012
Time Management/ Organizational Techniques	0.073	-0.168	0.306	0.555	0.005

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 52. Scatterplots for these correlations are displayed in Appendix Figures C10a, C10b, C10e, and C10f. For participants in the Fourth Grade, results show a negative correlation between study strategies and brief math achievement ($r = -0.120$, $p = 0.331$). Study strategies explain 1.4% of the variability in brief math achievement. A linear regression was used to determine if study strategies could predict brief math achievement. As study strategies increased, brief math achievement decreased (a = 103.311, 95% CI [90.656, 115.965], B = -0.122, 95% CI [-0.371, 0.127], β = -0.120, 95% CI [-0.359, 0.119]). The overall model was not statistically significant, $F(1, 66) = 0.958$, $p = 0.331$.

Results show a positive correlation between note taking and listening skills and brief math achievement ($r = 0.016$, $p = 0.895$). Note taking and listening skills explain <0.1% of the variability in brief math achievement. A linear regression was used to determine if note taking and listening skills could predict brief math achievement. As note taking and listening skills increased, brief math achievement increased (a = 96.462, 95% CI [84.556, 108.368], B = 0.016, 95% CI [-0.223, 0.255], β = 0.016, 95% CI [-0.225, 0.257]). The overall model was not statistically significant, $F(1, 66) = 0.018$, $p = 0.895$.

Results show a positive relationship between test-taking strategies and brief math achievement ($r = 0.099$, $p = 0.424$). Test-taking strategies explain 1.0% of the variability in brief math achievement. A linear regression was used to determine if test-taking strategies could predict brief math achievement. As test-taking strategies increased, brief math achievement increased (a = 92.635, 95% CI [80.946, 104.324], B = 0.089, 95% CI [-0.131, 0.308], β = 0.099, 95% CI [-0.140, 0.338]). The overall model was not statistically significant, $F(1, 66) = 0.648$, $p = 0.424$.

Results show a positive relationship between time management and organizational techniques and brief math achievement ($r = 0.051$, $p = 0.681$). Time management and organizational techniques explain 0.3% of the variability in brief math achievement. A linear regression was used to determine if time management and organizational techniques could predict brief math achievement. As time management and organizational techniques increased, brief math achievement increased (a = 94.740, 95% CI [82.408, 107.071], B = 0.049, 95% CI

[-0.189, 0.288], β = 0.051, 95% CI [-0.190, 0.292]). The overall model was not statistically significant, $F(1, 66) = 0.171$, $p = 0.681$.

Table 52

Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Brief Math, Fourth Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.120	-0.348	0.122	0.331	0.014
Note Taking/ Listening Skills	0.016	-0.223	0.253	0.895	<0.001
Test-Taking Strategies	0.099	-0.143	0.330	0.424	0.010
Time Management/ Organizational Techniques	0.051	-0.190	0.286	0.681	0.003

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 53. Scatterplots for these correlations are displayed in Appendix Figures C11a, C11b, C11e, and C11f. For participants in the Fourth Grade, results show a negative correlation between study strategies and math calculation skills ($r = -0.101$, $p = 0.412$). Study strategies explain 1.0% of the variability in math calculation skills. A linear regression was used to determine if study strategies could predict math calculation skills. As study strategies increased, math calculation skills decreased (*a* = 105.960, 95% CI [93.349, 118.570], *B* = -0.102, 95% CI [-0.350, 0.145], β = -0.101, 95% CI [-0.340, 0.138]). The overall model was not statistically significant, $F(1, 66) = 0.681$, $p = 0.412$.

Results show a negative correlation between note taking and listening skills and math calculation skills ($r = -0.014$, $p = 0.913$). Note taking and listening skills explain <0.1% of the variability in math calculation skills. A linear regression was used to determine if note taking and listening skills could predict math calculation skills. As note taking and listening skills increased, math calculation skills decreased (*a* = 101.489, 95% CI [89.648, 113.330], *B* = -0.013, 95% CI [-0.251, 0.225], β = -0.014, 95% CI [-0.255, 0.227]). The overall model was not statistically significant, $F(1, 66) = 0.012$, $p = 0.913$.

Results show a positive relationship between test-taking strategies and math calculation skills ($r = 0.020$, $p = 0.869$). Test-taking strategies explain <0.1% of the variability in math calculation skills. A linear regression was used to determine if test-taking strategies could predict math calculation skills. As test-taking strategies increased, math calculation skills increased (*a* = 99.905, 95% CI [88.226, 111.583], *B* = 0.018, 95% CI [-0.201, 0.238], β = 0.020, 95% CI [-0.221, 0.261]). The overall model was not statistically significant, $F(1, 66) = 0.028$, $p = 0.869$.

Results show a positive relationship between time management and organizational techniques and math calculation skills ($r = 0.031$, $p = 0.802$). Time management and organizational techniques explain 0.1% of the variability in math calculation skills. A linear regression was used to determine if time management and organizational techniques could predict math calculation skills. As time management and organizational techniques increased, math calculation skills increased (*a* = 99.338, 95% CI [87.065, 111.611], *B* = 0.030, 95% CI

[-0.207, 0.267], β = 0.031, 95% CI [-0.210, 0.272]). The overall model was not statistically significant, $F(1, 66) = 0.063$, $p = 0.802$.

Table 53
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques, with Math Calculation Skills, Fourth Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.101	-0.331	0.141	0.412	0.010
Note Taking/ Listening Skills	-0.014	-0.252	0.225	0.913	<0.001
Test-Taking Strategies	0.020	-0.219	0.257	0.869	<0.001
Time Management/ Organizational Techniques	0.031	-0.209	0.267	0.802	0.001

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 54. Scatterplots for these correlations are displayed in Appendix Figures C12a, C12b, C12e, and C12f. For participants in the Fourth Grade, results show a negative correlation between study strategies and math reasoning skills (r = -0.164,

$p = 0.183$). Study strategies explain 2.7% of the variability in math reasoning skills. A linear regression was used to determine if study strategies could predict math reasoning skills. As study strategies increased, math reasoning skills increased ($a = 106.209$, 95% CI [94.340, 118.079], $B = -0.157$, 95% CI [-0.391, 0.076], $\beta = -0.164$, 95% CI [-0.401, 0.073]). The overall model was not statistically significant, $F(1, 66) = 1.813$, $p = 0.183$.

Results show a positive correlation between note taking and listening skills and math reasoning skills ($r = 0.055$, $p = 0.658$). Note taking and listening skills explain 0.3% of the variability in math reasoning skills. A linear regression was used to determine if note taking and listening skills could predict math reasoning skills. As note taking and listening skills increased, math reasoning skills increased ($a = 95.928$, 95% CI [84.705, 107.152], $B = 0.050$, 95% CI [-0.175, 0.275], $\beta = 0.055$, 95% CI [-0.186, 0.296]). The overall model was not statistically significant, $F(1, 66) = 0.197$, $p = 0.658$.

Results show a positive relationship between test-taking strategies and math reasoning skills ($r = 0.126$, $p = 0.304$). Test-taking strategies explain 1.6% of the variability in math reasoning skills. A linear regression was used to determine if test-taking strategies could predict math reasoning skills. As test-taking strategies increased, math reasoning skills increased ($a = 92.799$, 95% CI [81.800, 103.798], $B = 0.107$, 95% CI [-0.099, 0.314], $\beta = 0.126$, 95% CI [-0.113, 0.365]). The overall model was not statistically significant, $F(1, 66) = 1.073$, $p = 0.304$.

Results show a positive relationship between time management and organizational techniques and math reasoning skills ($r = 0.027$, $p = 0.829$). Time management and organizational techniques explain 0.1% of the variability in math reasoning skills. A linear regression was used to determine if time management and organizational techniques could predict math reasoning skills. As time management and organizational techniques increased, math reasoning skills increased (*a* = 97.131, 95% CI [85.480, 108.782], *B* = 0.024, 95% CI [-0.201, 0.250], β = 0.027, 95% CI [-0.214, 0.268]). The overall model was not statistically significant, $F(1, 66) = 0.047$, $p = 0.829$.

Table 54
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques and Math Reasoning, Fourth Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	-0.164	-0.387	0.077	0.183	0.027
Note Taking/ Listening Skills	0.055	-0.186	0.290	0.658	0.003
Test-Taking Strategies	0.126	-0.116	0.354	0.304	0.016
Time Management/ Organizational Techniques	0.027	-0.213	0.264	0.829	0.001

Fifth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fifth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 55.

Table 55

Means for the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques Scales of the SMALSI and the WJ-III Math Clusters, Fifth Graders (n=48)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Study Strategies	46.85	10.160	43.974	49.725	Broad Math	99.56	16.358	94.932	104.188
Note Taking/ Listening Skills	46.79	9.563	44.085	49.495	Brief Math	98.88	16.374	94.248	103.512
Test Taking Strategies	48.83	10.646	46.047	51.613	Math Calculation Skills	98.40	17.095	93.564	103.235
Time Management/ Organizational Techniques	45.75	8.337	43.392	48.108	Math Reasoning	99.83	13.417	96.033	103.627

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 56. Scatterplots for these correlations are displayed in Appendix Figures C13a, C13b, C13e, and C13f. For participants in the Fifth Grade, results show a positive correlation between study strategies and broad math achievement ($r = 0.411$, $p = 0.004$). Study strategies explain 16.9% of the variability in broad math achievement. A linear regression was used to determine if study strategies could predict broad math achievement. As study strategies increased, broad math achievement increased ($a = 68.555$, 95% CI [47.683, 89.428], $B = 0.662$, 95% CI [0.226, 1.097], $\beta = 0.411$, 95% CI [0.148, 0.674]). The overall model was not statistically significant, $F(1, 46) = 9.353$, $p = 0.004$.

Results show a positive correlation between note taking and listening skills and broad math achievement ($r = 0.299$, $p = 0.039$). Note taking and listening skills explain 9.0% of the variability in broad math achievement. A linear regression was used to determine if note taking and listening skills could predict broad math achievement. As note taking and listening skills increased, broad math achievement increased ($a = 75.604$, 95% CI [52.480, 98.729], $B = 0.512$, 95% CI [0.028, 0.996], $\beta = 0.299$, 95% CI [0.022, 0.575]). The overall model was not statistically significant, $F(1, 46) = 4.527$, $p = 0.039$.

Results show a positive relationship between test-taking strategies and broad math achievement ($r = 0.340$, $p = 0.018$). Test-taking strategies explain 11.6% of the variability in broad math achievement. A linear regression was used to determine if test taking strategies could predict broad math achievement. As test taking strategies increased, broad math achievement increased ($a = 74.026$, 95% CI [52.605, 95.447], $B = 0.523$, 95% CI [0.094, 0.952], $\beta = 0.340$, 95% CI [0.067, 0.612]). The overall model was not statistically significant, $F(1, 46) = 6.026$, $p = 0.018$.

Results show a positive relationship between time management and organizational techniques and broad math achievement ($r = 0.352$, $p = 0.014$). Time management and organizational techniques explain 12.4% of the variability in broad math achievement. A linear regression was used to determine if time management and organizational techniques could predict broad math achievement. As time management and organizational techniques increased, broad math achievement increased ($a = 68.002$, 95% CI [42.661, 93.342], $B = 0.690$, 95% CI

[0.145, 1.235], β = 0.352, 95% CI [0.081, 0.622]). The overall model was not statistically significant, $F(1, 46) = 6.489$, $p = 0.014$.

Table 56
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Broad Math, Fifth Graders

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	0.411	0.144	0.622	0.004	0.169
Note Taking/ Listening Skills	0.299	0.016	0.537	0.039	0.090
Test-Taking Strategies	0.340	0.062	0.569	0.018	0.116
Time Management/ Organizational Techniques	0.352	0.075	0.578	0.014	0.124

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 57. Scatterplots for these correlations are displayed in Appendix Figures C14a, C14b, C14e, and C14f. For participants in the Fifth Grade, results show a positive correlation between study strategies and brief math achievement ($r = 0.391$, $p = 0.006$). Study strategies explain 15.3% of the variability in brief math achievement. A linear regression was used to determine if study strategies could predict brief math achievement. As study strategies increased, brief math achievement increased (a = 69.315, 95% CI [48.224, 90.405], B = 0.631, 95% CI [0.191, 1.071], β = 0.391, 95% CI [0.124, 0.658]). The overall model was statistically significant, $F(1, 46) = 8.326$, $p = 0.006$.

Results show a positive correlation between note taking and listening skills and brief math achievement ($r = 0.290$, $p = 0.046$). Note taking and listening skills explain 8.4% of the variability in brief math achievement. A linear regression was used to determine if note taking and listening skills could predict brief math achievement. As note taking and listening skills increased, brief math achievement increased (a = 75.677, 95% CI [52.456, 98.898], B = 0.496, 95% CI [0.009, 0.982], β = 0.290, 95% CI [0.013, 0.566]). The overall model was not statistically significant, $F(1, 46) = 4.209$, $p = 0.046$.

Results show a positive relationship between test-taking strategies and brief math achievement ($r = 0.339$, $p = 0.018$). Test-taking strategies explain 11.5% of the variability in brief math achievement. A linear regression was used to determine if test-taking strategies could predict brief math achievement. As test- taking strategies increased, brief math achievement increased (a = 73.425, 95% CI [51.970, 94.881], B = 0.521, 95% CI [0.092, 0.951], β = 0.339, 95% CI [0.066, 0.611]). The overall model was not statistically significant, $F(1, 46) = 5.966$, $p = 0.018$.

Results show a positive relationship between time management and organizational techniques and brief math achievement ($r = 0.340$, $p = 0.018$). Time management and organizational techniques explain 11.6% of the variability in brief math achievement. A linear regression was used to determine if time management and organizational techniques could predict brief math achievement. As time management and organizational techniques increased, brief math achievement increased (a = 68.312, 95% CI [42.831, 93.793], B = 0.668, 95% CI

[0.120, 1.216], β = 0.340, 95% CI [0.067, 0.612]). The overall model was not statistically significant, $F(1, 46) = 6.019$, $p = 0.018$.

Table 57
Correlations Between Study Strategies, Note Taking and Listening Skills, Time Management and Organizational Techniques, and Test-Taking Strategies with Brief Math, Fifth Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	0.391	0.120	0.608	0.006	0.153
Note Taking/ Listening Skills	0.290	0.006	0.530	0.046	0.084
Test-Taking Strategies	0.339	0.061	0.568	0.018	0.115
Time Management/ Organizational Techniques	0.340	0.062	0.569	0.018	0.116

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 58. Scatterplots for these correlations are displayed in Appendix Figures C15a, C15b, C15e, and C15f. For participants in the Fifth Grade, results show a positive correlation between study strategies and math calculation skills ($r = 0.423$, $p = 0.003$). Study strategies explain 17.9% of the variability in math calculation skills. A linear regression was used to determine if study strategies could predict math calculation skills. As study strategies increased, math calculation skills increased (a = 65.082, 95% CI [43.395, 86.770], B = 0.711, 95% CI [0.258, 1.164], β = 0.423, 95% CI [0.160, 0.686]). The overall model was statistically significant, $F(1, 46) = 10.000$, $p = 0.003$.

Results show a positive correlation between note taking and listening skills and math calculation skills ($r = 0.331$, $p = 0.021$). Note taking and listening skills explain 11.0% of the variability in math calculation skills. A linear regression was used to determine if note taking and listening skills could predict math calculation skills. As note taking and listening skills increased, math calculation skills increased (a = 70.678, 95% CI [46.780, 94.575], B = 0.592, 95% CI [0.092, 1.093], β = 0.331, 95% CI [0.058, 0.603]). The overall model was not statistically significant, $F(1, 46) = 5.674$, $p = 0.021$.

Results show a positive relationship between test-taking strategies and math calculation skills ($r = 0.311$, $p = 0.031$). Test-taking strategies explain 9.7% of the variability in math calculation skills. A linear regression was used to determine if test taking strategies could predict math calculation skills. As test taking strategies increased, math calculation skills increased (a = 74.008, 95% CI [51.380, 96.636], B = 0.499, 95% CI [0.046, 0.952], β = 0.311, 95% CI [0.036, 0.585]). The overall model was not statistically significant, $F(1, 46) = 4.926$, $p = 0.031$.

Results show a positive relationship between time management and organizational techniques and math calculation skills ($r = 0.370$, $p = 0.010$). Time management and organizational techniques explain 13.7% of the variability in math calculation skills. A linear regression was used to determine if time management and organizational techniques could predict math calculation skills. As time management and organizational techniques increased, math calculation skills increased (a = 63.642, 95% CI [37.365, 89.919], B = 0.760, 95% CI

[0.194, 1.325], β = 0.370, 95% CI [0.101, 0.639]). The overall model was statistically significant, $F(1, 46) = 7.318$, $p = 0.010$.

Table 58
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Calculation Skills, Fifth Graders

SMALSI Scale	Math Calculation Skills	95% Confidence Interval		p	r^2
		Lower	Upper		
Study Strategies	0.423	0.158	0.631	0.003	0.179
Note Taking/ Listening Skills	0.331	0.052	0.562	0.021	0.110
Test-Taking Strategies	0.311	0.029	0.547	0.031	0.097
Time Management/ Organizational Techniques	0.370	0.096	0.592	0.010	0.137

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Study Strategies, Note Taking/Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 59. Scatterplots for these correlations are displayed in Appendix Figures C16a, C16b, C16e, and C16f. For participants in the Fifth Grade, results show a positive correlation between study strategies and math reasoning skills ($r = 0.368$, $p = 0.010$). Study strategies explain 13.6% of the variability in math reasoning skills. A linear regression was used to determine if study strategies could predict math reasoning skills. As study strategies increased, math reasoning skills increased (*a* = 77.055, 95% CI [59.593, 94.516], *B* = 0.486, 95% CI [0.122, 0.851], β = 0.368, 95% CI [0.099, 0.637]). The overall model was statistically significant, $F(1, 46) = 7.212$, $p = 0.010$.

Results show a positive correlation between note taking and listening skills and math reasoning skills ($r = 0.290$, $p = 0.046$). Note taking and listening skills explain 8.4% of the variability in math reasoning skills. A linear regression was used to determine if note taking and listening skills could predict math reasoning skills. As note taking and listening skills increased, math reasoning skills increased (*a* = 80.810, 95% CI [61.784, 99.836], *B* = 0.407, 95% CI [0.008, 0.805], β = 0.290, 95% CI [0.013, 0.566]). The overall model was not statistically significant, $F(1, 46) = 4.216$, $p = 0.046$.

Results show a positive relationship between test-taking strategies and math reasoning skills ($r = 0.377$, $p = 0.008$). Test-taking strategies explain 14.2% of the variability in math reasoning skills. A linear regression was used to determine if test-taking strategies could predict math reasoning skills. As test-taking strategies increased, math reasoning skills increased (*a* = 76.615, 95% CI [59.310, 93.920], *B* = 0.475, 95% CI [0.129, 0.822], β = 0.377, 95% CI [0.108, 0.646]). The overall model was statistically significant, $F(1, 46) = 7.634$, $p = 0.008$.

Results show a positive relationship between time management and organizational techniques and math reasoning skills ($r = 0.315$, $p = 0.029$). Time management and organizational techniques explain 9.9% of the variability in math reasoning skills. A linear regression was used to determine if time management and organizational techniques could predict math reasoning skills. As time management and organizational techniques increased, math reasoning skills increased (*a* = 76.629, 95% CI [55.558, 97.701], *B* = 0.507, 95% CI

[0.054, 0.960], β = 0.315, 95% CI [0.040, 0.589]). The overall model was not statistically significant, $F(1, 46) = 5.073$, $p = 0.029$.

Table 59
Correlations Between Study Strategies, Note Taking and Listening Skills, Test-Taking Strategies, and Time Management and Organizational Techniques with Math Reasoning, Fifth Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Study Strategies	0.368	0.094	0.590	0.010	0.136
Note Taking/ Listening Skills	0.290	0.006	0.530	0.046	0.084
Test-Taking Strategies	0.377	0.104	0.597	0.008	0.142
Time Management/ Organizational Techniques	0.315	0.034	0.550	0.029	0.099

Question Two

2.) What is the relationship between scores on the Reading/Comprehension Strategies and Writing/Research Skills scales and the math cluster scores of the WJ-III?

According to the hypothesis for Question 2, the researcher proposed that there would be a positive relationship between reading and comprehension strategies and broad math achievement and between writing and research skills and broad math achievement. There would be a positive relationship between reading and comprehension strategies and brief math achievement and between writing and research skills and brief math achievement. There would be a positive relationship between reading and comprehension strategies and math calculation skills and between writing and research skills and math calculation skills. There would be a positive relationship between reading and comprehension strategies and math reasoning skills and between writing and research skills and math reasoning skills.

Question 2 was answered using the Pearson *r* correlation coefficient and linear regression. First, Pearson *r* coefficients were calculated using the scores for each scale of the SMALSI as predictor variables and the scores for each math cluster of the WJ-III as a criterion variable. The coefficient of determinism, r squared or r^2, was calculated to determine how much variability within each math cluster was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which scores on each scale of the SMALSI can be used to predict scores for each math cluster of the WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson r and linear regression values was 0.01.

Full Sample

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the full sample of participants on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 60.

Table 60

Means for the Reading/Comprehension Strategies and Writing/Research Skills Scales of the SMALSI and the WJ-III Math Clusters, Full Sample (n=176)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Reading/ Comprehension Strategies	49.27	10.683	47.692	50.848	Broad Math	99.22	14.761	97.038	101.401
Writing/ Research Skills	51.25	11.742	49.515	52.985	Brief Math	98.57	14.515	96.425	100.714
					Math Calculation Skills	99.86	14.665	97.694	102.026
					Math Reasoning	98.78	13.420	96.796	100.764

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 61. Scatterplots for these correlations are displayed in Appendix Figures C1c and C1d. For the full sample of participants, results show a negative correlation between reading and comprehension strategies and broad math achievement (r = -0.058, p = 0.441). Reading and comprehension strategies explain 0.3% of the variability in broad math achievement. A linear regression was used to determine if reading and comprehension strategies could predict broad math achievement. As reading and comprehension strategies increased, broad math achievement increased (a = 103.204, 95% CI [92.801, 113.607], B = -0.081, 95% CI [-0.287, 0.126], β = -0.058, 95% CI [-0.206, 0.091]). The overall model was not statistically significant, F(1, 174) = 0.598,

$p = 0.441$.

Results show a positive correlation between writing and research skills and broad math achievement ($r = 0.168$, $p = 0.026$). Writing and research skills explain 2.8% of the variability in broad math achievement. A linear regression was used to determine if writing and research skills could predict broad math achievement. As writing and research skills increased, broad math achievement increased ($a = 88.421$, 95% CI [78.672, 98.169], $B = 0.211$, 95% CI [-0.025, 0.396], $\beta = 0.168$, 95% CI [0.021, 0.315]). The overall model was not statistically significant, $F(1, 174) = 5.032$, $p = 0.026$.

Table 61
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Broad Math, Full Sample

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	-0.058	-0.204	0.091	0.441	0.003
Writing/Research Skills	0.168	0.021	0.308	0.026	0.028

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 62. Scatterplots for these correlations are displayed in Appendix Figures C2c and C2d. For the full sample of participants, results show a negative correlation between reading and comprehension strategies and brief math achievement ($r = -0.076$, $p = 0.318$). Reading and comprehension strategies explain 0.6% of the variability in brief math achievement. A linear regression was used to determine if reading and comprehension strategies could predict brief math achievement. As reading and comprehension strategies increased, brief math achievement increased (*a* = 103.638, 95% CI [93.420, 113.856], *B* = -0.103, 95% CI [-0.306, 0.100], β = -0.076, 95% CI [-0.224, 0.073]). The overall model was not statistically significant, $F(1, 174) = 1.002$, $p = 0.318$.

Results show a positive correlation between writing and research skills and brief math achievement ($r = 0.143$, $p = 0.059$). Writing and research skills explain 2.0% of the variability in brief math achievement. A linear regression was used to determine if writing and research skills could predict brief math achievement. As writing and research skills increased, brief math achievement increased (*a* = 89.524, 95% CI [79.900, 99.148], *B* = 0.177, 95% CI [-0.006, 0.360], β = 0.143, 95% CI [-0.004, 0.290]). The overall model was not statistically significant, $F(1, 174) = 3.625$, $p = 0.059$.

Table 62
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Brief Math, Full Sample

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.076	-0.221	0.073	0.318	0.006
Writing/Research Skills	0.143	-0.005	0.285	0.059	0.020

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Reading/Comprehension Strategies and Writing/Research Skills scales of the

SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 63. Scatterplots for these correlations are displayed in Appendix Figures C3c and C3d. For the full sample of participants, results show a positive correlation between reading and comprehension strategies and math calculation skills (r = 0.027, p = 0.724). Reading and comprehension strategies explain 0.1% of the variability in math calculation skills. A linear regression was used to determine if reading and comprehension strategies could predict math calculation skills. As reading and comprehension strategies increased, math calculation skills increased (a = 98.052, 95% CI [87.703, 108.401], B = 0.037, 95% CI [-0.169, 0.242], β = 0.027, 95% CI [-0.121, 0.176]). The overall model was not statistically significant, $F(1, 174) = 0.125$, p = 0.724.

Results show a positive correlation between writing and research skills and math calculation skills (r = 0.188, p = 0.012). Writing and research skills explain 3.5% of the variability in math calculation skills. A linear regression was used to determine if writing and research skills could predict math calculation skills. As writing and research skills increased, math calculation skills increased (a = 87.829, 95% CI [78.181, 97.477], B = 0.235, 95% CI [0.051, 0.418], β = 0.188, 95% CI [0.042, 0.333]). The overall model was not statistically significant, $F(1, 174) = 6.377$, p = 0.012.

Table 63
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Calculation Skills, Full Sample

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	0.027	-0.121	0.174	0.724	0.001
Writing/Research Skills	0.188	0.041	0.327	0.012	0.035

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 64. Scatterplots for these correlations are displayed in Appendix Figures C4c and C4d. For the full sample of participants, results show a negative correlation between reading and comprehension strategies and math reasoning skills (r = -0.112, p = 0.139). Reading and comprehension strategies explain 1.3% of the variability in math reasoning skills. A linear regression was used to determine if reading and comprehension strategies could predict math reasoning skills. As reading and comprehension strategies increased, math reasoning skills increased (a = 105.705, 95% CI [96.291, 115.120], B = -0.140, 95% CI [-0.327, 0.046], β = -0.112, 95% CI [-0.259, 0.035]). The overall model was not statistically significant, $F(1, 174) = 2.204$, p = 0.139.

Results show a positive correlation between writing and research skills and math reasoning skills (r = 0.164, p = 0.030). Writing and research skills explain 2.7% of the variability in math reasoning skills. A linear regression was used to determine if writing and research skills could predict math reasoning skills. As writing and research skills increased, math reasoning skills increased (a = 89.178, 95% CI [80.310, 98.046], B = 0.187, 95% CI [0.019, 0.356], β = 0.164, 95% CI [0.017, 0.311]). The overall model was not statistically significant, $F(1, 174) = 4.809$, p = 0.030.

Table 64
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Reasoning, Full Sample

SMALSI Scale	Math Reasoning	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	-0.112	-0.256	0.037	0.139	0.013
Writing/Research Skills	0.164	0.016	0.305	0.030	0.027

Third Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the participants in the Third Grade on the Reading/ Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 65.

Table 65
Means for the Reading/Comprehension Strategies and Writing/Research Skills Scales of the SMALSI and the WJ-III Math Clusters, Third Graders (n=60)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Reading/ Comprehension Strategies	49.70	11.072	46.899	52.501	Broad Math	98.22	17.862	93.700	102.739
Writing/ Research Skills	48.70	11.550	45.777	51.622	Brief Math	97.93	17.727	93.445	102.415
					Math Calculation Skills	101.07	16.679	96.850	105.289
					Math Reasoning	97.87	15.387	93.977	101.763

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 66. Scatterplots for these correlations are displayed in Appendix Figures C5c and C5d. For participants in the Third Grade, results show a negative correlation between reading and comprehension strategies and broad math achievement ($r = -0.195$, $p = 0.135$). Reading and comprehension strategies explain 3.8% of the variability in broad math achievement. A linear regression was used to determine if reading and comprehension strategies could predict broad math achievement. As reading and comprehension strategies increased, broad math achievement decreased ($a = 113.850$, 95% CI [92.682, 135.019], $B = -0.315$, 95% CI [-0.730, 0.101], $\beta = -0.195$, 95% CI [-0.447, 0.058]). The overall model was not statistically significant, $F(1, 58) = 2.292$, $p = 0.135$.

Results show a negative correlation between writing and research skills and broad math achievement ($r = -0.023$, $p = 0.862$). Writing and research skills explain 0.1% of the variability in broad math achievement. A linear regression was used to determine if writing and research skills could predict broad math achievement. As writing and research skills increased, broad math achievement decreased ($a = 99.937$, 95% CI [79.607, 120.268], $B = -0.035$, 95% CI [-0.442, 0.371], $\beta = -0.023$, 95% CI [-0.279, 0.234]. The overall model was not statistically significant, $F(1, 58) = 0.030$, $p = 0.862$.

Table 66
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Broad Math, Third Graders

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	-0.195	-0.428	0.062	0.135	0.038
Writing/Research Skills	-0.023	-0.275	0.232	0.862	0.001

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 67. Scatterplots for these correlations are displayed in Appendix Figures C6c and C6d. For participants in the Third Grade, results show a negative correlation between reading and comprehension strategies and brief math achievement (r = -0.209, p = 0.108). Reading and comprehension strategies explain 4.4% of the variability in brief math achievement. A linear regression was used to determine if reading and comprehension strategies could predict brief math achievement. As reading and comprehension strategies increased, brief math achievement decreased (a = 114.598, 95% CI [93.655, 135.542], B = -0.335, 95% CI [-0.747, 0.076], β = -0.209, 95% CI [-0.459, 0.042]). The overall model was not statistically significant, F(1, 58) = 2.661, p = 0.108.

Results show a negative correlation between writing and research skills and brief math achievement (r = -0.037, p = 0.779). Writing and research skills explain 0.1% of the variability in brief math achievement. A linear regression was used to determine if writing and research skills could predict brief math achievement. As writing and research skills increased, brief math achievement decreased (*a* = 100.700, 95% CI [80.533, 120.868], *B* = -0.057, 95% CI [-0.460, 0.346], β = -0.037, 95% CI [-0.293, 0.220]. The overall model was not statistically significant, $F(1, 58) = 0.080$, $p = 0.779$.

Table 67
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Brief Math, Third Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.209	-0.440	0.047	0.108	0.044
Writing/Research Skills	-0.037	-0.288	0.219	0.779	0.001

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 68. Scatterplots for these correlations are displayed in Appendix Figures C7c and C7d. For the participants in the Third Grade, results show a negative correlation between reading and comprehension strategies and math calculation skills ($r = -0.066$, $p = 0.615$). Reading and comprehension strategies explain 0.4% of the variability in math calculation skills. A linear regression was used to determine if reading and comprehension strategies could predict math calculation skills. As reading and comprehension strategies increased, math calculation skills decreased (*a* = 106.027, 95% CI [85.918, 126.316], *B*= -0.100, 95% CI [-0.495, 0.295], β= -0.066, 95% CI [-0.322, 0.191]). The overall model was not statistically significant,

$F(1, 58) = 0.256$, $p = 0.615$.

Results show a positive correlation between writing and research skills and math calculation skills ($r = 0.056$, $p = 0.670$). Writing and research skills explain 0.3% of the variability in math calculation skills. A linear regression was used to determine if writing and research skills could predict math calculation skills. As writing and research skills increased, math calculation skills increased ($a = 97.112$, 95% CI [78.152, 116.071], $B = 0.081$, 95% CI [-0.298, 0.460], $\beta = 0.056$, 95% CI [-0.200, 0.313]). The overall model was not statistically significant, $F(1, 58) = 0.184$, $p = 0.670$.

Table 68
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Calculation Skills, Third Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.066	-0.315	0.191	0.615	0.004
Writing/Research Skills	0.056	-0.201	0.306	0.670	0.003

<u>Math Reasoning</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 69. Scatterplots for these correlations are displayed in Appendix Figures C8c and C8d. For participants in the Third Grade, results show a negative correlation between reading and comprehension strategies and math reasoning skills (r = -0.267, p = 0.039). Reading and comprehension strategies explain 7.1% of the variability in math reasoning skills. A linear regression was used to determine if reading and comprehension strategies could predict math reasoning skills. As reading and comprehension strategies increased, math reasoning skills decreased (a = 116.327, 95% CI [98.411, 134.242], B = -0.371, 95% CI [-0.723, -0.019], β = -0.267, 95% CI [-0.515, -0.018]). The overall model was not statistically significant, F(1, 58) = 4.462, p = 0.039.

Results show a negative correlation between writing and research skills and math reasoning skills (r = -0.052, p = 0.690). Writing and research skills explain 0.3% of the variability in math reasoning skills. A linear regression was used to determine if writing and research skills could predict math reasoning skills. As writing and research skills increased, math reasoning skills decreased (a = 101.272, 95% CI [83.778, 118.766], B = -0.070, 95% CI [-0.420, 0.280], β = -0.052, 95% CI [-0.308, 0.205]. The overall model was not statistically significant, F(1, 58) = 0.160, p = 0.690.

Table 69
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Reasoning, Third Graders

SMALSI Scale	Math Reasoning	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	-0.267	-0.488	-0.014	0.039	0.071
Writing/Research Skills	-0.052	-0.302	0.205	0.690	0.003

Fourth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the participants in the Fourth Grade on the Reading/

Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 70.

Table 70
Means for the Reading/Comprehension Strategies and Writing/Research Skills Scales of the SMALSI and the WJ-III Math Clusters, Fourth Graders (n=68)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Reading/ Comprehension Strategies	49.97	10.316	47.518	52.422	Broad Math	98.35	10.792	95.784	100.916
Writing/ Research Skills	54.24	12.675	51.227	57.253	Brief Math	97.24	10.511	94.741	99.739
					Math Calculation Skills	100.85	10.453	98.364	103.335
					Math Reasoning	98.37	9.922	96.012	100.728

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 71. Scatterplots for these correlations are displayed in Appendix Figures C9c and C9d. For participants in the Fourth Grade, results show a negative correlation between reading and comprehension strategies and broad math achievement (r = -0.091, p = 0.463). Reading and comprehension strategies explain 0.8% of the variability in broad math achievement. A linear regression was used to determine if reading and comprehension strategies could predict broad math achievement. As reading and comprehension strategies increased, broad math achievement decreased (*a* = 103.086, 95% CI [90.025, 116.147], *B* = -0.095, 95% CI [-0.351, 0.161], β = -0.091, 95% CI [-0.332, 0.150]). The overall model was not statistically significant, $F(1, 66) = 0.545$, $p = 0.463$.

Results show a positive correlation between writing and research skills and broad math achievement ($r = 0.284$, $p = 0.019$). Writing and research skills explain 8.0% of the variability in broad math achievement. A linear regression was used to determine if writing and research skills could predict broad math achievement. As writing and research skills increased, broad math achievement increased (*a* = 85.251, 95% CI [74.080, 96.422], *B* = 0.242, 95% CI [0.041, 0.442], β = 0.284, 95% CI [0.052, 0.515]). The overall model was not statistically significant, $F(1, 66) = 5.778$, $p = 0.019$.

Table 71
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Broad Math, Fourth Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.091	-0.322	0.151	0.463	0.008
Writing/Research Skills	0.284	0.049	0.489	0.019	0.080

<u>Brief Math</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 72. Scatterplots for these correlations are displayed in Appendix Figures C10c and C10d. For participants in the Fourth Grade, results show a negative correlation between reading and comprehension strategies and brief math achievement (r = -0.112, p = 0.364). Reading and comprehension strategies explain 1.2% of the variability in brief math achievement. A linear regression was used to determine if reading and comprehension strategies could predict brief math achievement. As reading and comprehension strategies increased, brief math achievement increased (a = 102.923, 95% CI [90.230, 115.616], B = -0.114, 95% CI [-0.363, 0.135], β = -0.112, 95% CI [-0.351, 0.127]). The overall model was not statistically significant, F(1, 66) = 0.834, p = 0.364.

Results show a positive correlation between writing and research skills and brief math achievement (r = 0.251, p = 0.039). Writing and research skills explain 6.3% of the variability in brief math achievement. A linear regression was used to determine if writing and research skills could predict brief math achievement. As writing and research skills increased, brief math achievement increased (a = 85.938, 95% CI [74.955, 96.921], B = 0.208, 95% CI [0.011, 0.406], β = 0.251, 95% CI [0.017, 0.484]). The overall model was not statistically significant, F(1, 66) = 4.445, p = 0.039.

Table 72
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Brief Math, Fourth Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.112	-0.341	0.130	0.364	0.012
Writing/Research Skills	0.251	0.013	0.462	0.039	0.063

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 73. Scatterplots for these correlations are displayed in Appendix Figures C11c and C11d. For the participants in the Fourth Grade, results show a negative correlation between reading and comprehension strategies and math calculation skills ($r = -0.069$, $p = 0.578$). Reading and comprehension strategies explain 0.5% of the variability in math calculation skills. A linear regression was used to determine if reading and comprehension strategies could predict math calculation skills. As reading and comprehension strategies increased, math calculation skills decreased (a = 104.331, 95% CI [91.659, 117.004], $B = -0.070$, 95% CI [-0.318, 0.179], $\beta = -0.069$, 95% CI [-0.310, 0.172]). The overall model was not statistically significant, $F(1, 66) = 0.313$, $p = 0.578$.

Results show a positive correlation between writing and research skills and math calculation skills ($r = 0.191$, $p = 0.118$). Writing and research skills explain 3.7% of the variability in math calculation skills. A linear regression was used to determine if writing and research skills could predict math calculation skills. As writing and research skills increased, math calculation skills increased (a = 92.301, 95% CI [81.225, 103.376], $B = 0.158$, 95% CI [-0.041, 0.357], $\beta = 0.191$, 95% CI [-0.046, 0.428]). The overall model was not statistically significant, $F(1, 66) = 2.505$, $p = 0.118$.

Table 73
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Calculation Skills, Fourth Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.069	-0.302	0.172	0.578	0.005
Writing/Research Skills	0.191	-0.050	0.411	0.118	0.037

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 74. Scatterplots for these correlations are displayed in Appendix Figures C12c and C12d. For participants in the Fourth Grade, results show a negative correlation between reading and comprehension strategies and math reasoning skills (r = -0.169, p = 0.169). Reading and comprehension strategies explain 2.9% of the variability in math reasoning skills. A linear regression was used to determine if reading and comprehension strategies could predict math reasoning skills. As reading and comprehension strategies increased, math reasoning skills decreased (a = 106.485, 95% CI [94.601, 118.369], B = -0.162, 95% CI [-0.395, 0.071], β = -0.169, 95% CI [-0.406, 0.068]). The overall model was not statistically significant, $F(1, 66) = 1.938$, p = 0.169.

Results show a positive correlation between writing and research skills and math reasoning skills (r = 0.280, p = 0.021). Writing and research skills explain 7.9% of the variability in math reasoning skills. A linear regression was used to determine if writing and research skills could predict math reasoning skills. As writing and research skills increased, math reasoning skills increased (a =86.466, 95% CI [76.185, 96.747], *B* = 0.219, 95% CI [0.035, 0.404], β = 0.280, 95% CI [0.048, 0.511]). The overall model was not statistically significant, *F*(1, 66) = 5.629, *p* = 0.021.

Table 74
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Reasoning, Fourth Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	-0.169	-0.392	0.072	0.169	0.029
Writing/Research Skills	0.280	0.045	0.486	0.021	0.079

Fifth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the participants in the Fifth Grade on the Reading/ Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 75.

Table 75
Means for the Reading/Comprehension Strategies and Writing/Research Skills Scales of the SMALSI and the WJ-III Math Clusters, Fifth Graders (n=48)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Reading/ Comprehension Strategies	47.73	10.770	44.684	50.776	Broad Math	99.56	16.358	94.932	104.188
Writing/ Research Skills	50.21	9.726	47.458	52.962	Brief Math	98.88	16.374	94.248	103.512
					Math Calculation Skills	98.40	17.095	93.564	103.235
					Math Reasoning	99.83	13.417	96.033	103.627

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 76. Scatterplots for these correlations are displayed in Appendix Figures C13c and C13d. For participants in the Fifth Grade, results show a positive correlation between reading and comprehension strategies and broad math achievement ($r = 0.162$, $p = 0.271$). Reading and comprehension strategies explain 2.6% of the variability in broad math achievement. A linear regression was used to determine if reading and comprehension strategies could predict broad math achievement. As reading and comprehension strategies increased, broad math achievement increased ($a = 87.819$, 95% CI [66.066, 109.572], $B = 0.246$, 95% CI [-0.199, 0.691], $\beta = 0.162$, 95% CI [-0.122, 0.446]). The overall model was not statistically significant, $F(1, 46) = 1.240$, $p = 0.271$.

Results show a positive correlation between writing and research skills and broad math achievement ($r = 0.373$, $p = 0.009$). Writing and research skills explain 13.9% of the variability in broad math achievement. A linear regression was used to determine if writing and research skills could predict broad math achievement. As writing and research increased, broad math achievement increased ($a = 68.039$, 95% CI [44.366, 91.712], $B = 0.628$, 95% CI [0.165, 1.091], $\beta = 0.373$, 95% CI [0.104, 0.641]). The overall model was statistically significant, $F(1, 46) = 7.449$, $p = 0.009$.

Table 76
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Broad Math, Fifth Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r²**
		Lower	**Upper**		
Reading/Comprehension Strategies	0.162	-0.128	0.427	0.271	0.026
Writing/Research Skills	0.373	0.099	0.594	0.009	0.139

<u>Brief Math</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 77. Scatterplots for these correlations are displayed in Appendix Figures C14c and C14d. For participants in the Fifth Grade, results show a positive correlation between reading and comprehension strategies and brief math achievement ($r = 0.147$, $p = 0.318$). Reading and comprehension strategies explain 2.2% of the variability in brief math achievement. A linear regression was used to determine if reading and comprehension strategies could predict brief math achievement. As reading and comprehension strategies increased, brief math achievement increased (*a* = 88.199, 95% CI [66.372, 110.026], *B* = 0.224, 95% CI [-0.223, 0.670], β = 0.147, 95% CI [-0.139, 0.433]). The overall model was not statistically significant, $F(1, 46) = 1.018$, $p = 0.318$.

Results show a positive correlation between writing and research skills and brief math achievement ($r = 0.360$, $p = 0.012$). Writing and research skills explain 12.9% of the variability in brief math achievement. A linear regression was used to determine if writing and research skills could predict brief math achievement. As writing and research skills increased, brief math achievement increased (*a* = 68.460, 95% CI [44.627, 92.292], *B* = 0.606, 95% CI [0.140, 1.072], β = 0.360, 95% CI [0.089, 0.630]). The overall model was not statistically significant, $F(1, 46) = 6.842$, $p = 0.012$.

Table 77

Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Brief Math, Fifth Graders

SMALSI Scale	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	0.147	-0.143	0.414	0.318	0.022
Writing/Research Skills	0.360	0.085	0.584	0.012	0.129

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 78.

Scatterplots for these correlations are displayed in Appendix Figures C15c and C15d. For the participants in the Fifth Grade, results show a positive correlation between reading and comprehension strategies and math calculation skills ($r = 0.194$, $p = 0.187$). Reading and comprehension strategies explain 3.8% of the variability in math calculation skills. A linear regression was used to determine if reading and comprehension strategies could predict math calculation skills. As reading and comprehension strategies increased, math calculation skills increased ($a = 83.721$, 95% CI [61.118, 106.323], $B = 0.307$, 95% CI [-0.155, 0.770], $\beta = 0.194$, 95% CI [-0.090, 0.478]). The overall model was not statistically significant, $F(1, 46) = 1.793$, $p = 0.187$.

Results show a positive correlation between writing and research skills and math calculation skills ($r = 0.381$, $p = 0.008$). Writing and research skills explain 14.5% of the variability in math calculation skills. A linear regression was used to determine if writing and research skills could predict math calculation skills. As writing and research skills increased, math calculation skills increased ($a = 64.798$, 95% CI [40.138, 89.458], $B = 0.669$, 95% CI [0.187, 1.152], $\beta = 0.381$, 95% CI [0.114, 0.648]). The overall model was statistically significant, $F(1, 46) = 7.797$, $p = 0.008$.

Table 78
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Calculation Skills, Fifth Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Reading/Comprehension Strategies	0.194	-0.095	0.453	0.187	0.038
Writing/Research Skills	0.669	0.475	0.801	0.008	0.145

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Reading/Comprehension Strategies and Writing/Research Skills scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 79. Scatterplots for these correlations are displayed in Appendix Figures C16c and C16d. For participants in the Fifth Grade, results show a positive correlation between reading and comprehension strategies and math reasoning skills ($r = 0.158$, $p = 0.283$). Reading and comprehension strategies explain 2.5% of the variability in math reasoning skills. A linear regression was used to determine if reading and comprehension strategies could predict math reasoning skills. As reading and comprehension strategies increased, math reasoning skills increased ($a = 90.423$, 95% CI [72.569, 108.277], $B = 0.197$, 95% CI [-0.168, 0.562], $\beta = 0.158$, 95% CI [-0.128, 0.444]). The overall model was statistically significant, $F(1, 46) = 1.182$, $p = 0.283$.

Results show a positive correlation between writing and research skills and math reasoning skills ($r = 0.367$, $p = 0.010$). Writing and research skills explain 13.5% of the variability in math reasoning skills. A linear regression was used to determine if writing and research skills could predict math reasoning skills. As writing and research skills increased, math reasoning skills increased ($a = 74.832$, 95% CI [54.916, 93.848], $B = 0.507$, 95% CI [0.126, 0.888], $\beta = 0.367$, 95% CI [0.098, 0.636]). The overall model was statistically significant, $F(1, 46) = 7.181$, $p = 0.010$.

Table 79
Correlations Between Reading/Comprehension Strategies and Writing/Research Skills with Math Reasoning, Fifth Graders

SMALSI Scale	Math Reasoning	95% Confidence Interval		p	r^2
		Lower	Upper		
Reading/Comprehension Strategies	0.158	-0.132	0.423	0.283	0.025
Writing/Research Skills	0.367	0.093	0.590	0.010	0.135

Question Three

3.) What is the relationship between scores on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales and the math cluster scores of the WJ-III?

According to the hypothesis for Question 3, the researcher proposed that there would be a negative relationship between low academic motivation and broad math achievement, test anxiety and broad math achievement, and difficulties with attention and concentration and broad math achievement. There would be a negative relationship between low academic motivation and brief math achievement, test anxiety and brief math achievement, and difficulties with attention and concentration and brief math achievement. There would be a negative relationship between low academic motivation and math calculation skills, test anxiety and math calculation skills, and difficulties with attention and concentration and math calculation skills. There would be a negative relationship between low academic motivation and math reasoning skills, test anxiety and math reasoning skills, and difficulties with attention and concentration and math reasoning skills.

Question 3 was answered using the Pearson *r* correlation coefficient and linear regression. First, Pearson *r* coefficients were calculated using the scores for each scale of the

SMALSI as predictor variables and the scores for each math cluster of the WJ-III as a criterion variable. The coefficient of determinism, r squared or r^2, was calculated to determine how much variability within each math cluster was explained by each scale of the SMALSI. Then, linear regression was used to determine the degree to which scores on each scale of the SMALSI can be used to predict scores for each math cluster of the WJ-III. To correct for any experiment-wise Type I error, the alpha level for the Pearson r and linear regression values was 0.01.

Full Sample

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the full sample of participants on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 80.

Table 80
Means for the Low Academic Motivation, Test Anxiety, Concentration/Attention Difficulties Scales of the SMALSI and the WJ-III Math Clusters, Full Sample (n=176)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Low Academic Motivation	50.89	11.817	49.143	52.636	Broad Math	99.22	14.761	97.038	101.401
Test Anxiety	51.14	10.356	49.609	52.671	Brief Math	98.57	14.515	96.425	100.714
Concentration/ Attention Difficulties	50.05	12.736	48.168	51.932	Math Calculation Skills	99.86	14.665	97.694	102.026
					Math Reasoning	98.78	13.420	96.796	100.764

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 81. Scatterplots for these correlations are displayed in Appendix Figures C1g through C1i. For the full sample of participants, results show a negative correlation between low academic motivation and broad math achievement ($r = -0.307$, $p < 0.001$). Low academic motivation explains 9.4% of the variability in broad math achievement. A linear regression was used to determine if low academic motivation could predict broad math achievement. As low academic motivation increased, broad math achievement decreased ($a = 118.737$, 95% CI [109.446, 128.029], $B = -0.384$, 95% CI [-0.561, -0.206], $\beta = -0.307$, 95% CI [-0.448, -0.166]). The overall model was statistically significant, $F(1, 174) = 18.107$, $p < 0.001$.

Results show a negative correlation between test anxiety and broad math achievement ($r = -0.222$, $p = 0.003$). Test anxiety explains 4.9% of the variability in broad math achievement. A linear regression was used to determine if test anxiety could predict broad math achievement. As test anxiety increased, broad math achievement decreased ($a = 115.405$, 95% CI [104.556, 126.254], $B = -0.316$, 95% CI [-0.524, -0.109], $\beta = -0.222$, 95% CI [-0.367, -0.077]). The overall model was statistically significant, $F(1, 174) = 9.022$, $p = 0.003$.

Results show a negative correlation between attention and concentration difficulties and broad math achievement ($r = -0.227$, $p = 0.002$). Attention and concentration difficulties explain 5.2% of the variability in broad math achievement. A linear regression was used to determine if attention and concentration difficulties could predict broad math achievement. As attention and concentration difficulties increased, broad math achievement decreased (a = 112.387, 95% CI [103.666, 121.109], B = -0.263, 95% CI [-0.432, -0.094], β = -0.227, 95% CI [-0.372, -0.082]). The overall model was statistically significant, $F(1, 174) = 9.449$, $p = 0.002$.

Table 81
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Broad Math, Full Sample

SMALSI Scale	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.307	-0.435	-0.167	<0.001	0.094
Test Anxiety	-0.222	-0.358	-0.077	0.003	0.049
Concentration/ Attention Difficulties	-0.227	-0.363	-0.082	0.002	0.052

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 82. Scatterplots for these correlations are displayed in Appendix Figures C2g through C2i. For the full sample of participants, results show a negative correlation between low academic motivation and brief math achievement ($r = -0.293$, $p < 0.001$). Low academic motivation explains 8.6% of the variability in brief math achievement. A linear regression was used to determine if low academic motivation could predict brief math achievement. As low academic motivation increased, brief math achievement decreased (a = 116.884, 95% CI [107.705, 126.063], *B* = -0.360, 95% CI [-0.536, -0.184], β = -0.293, 95% CI [-0.434, -0.152]). The overall model was statistically significant, $F(1, 174) = 16.332$, $p < 0.001$.

Results show a negative correlation between test anxiety and brief math achievement ($r = -0.214$, $p = 0.004$). Test anxiety explains 4.6% of the variability in brief math achievement. A linear regression was used to determine if test anxiety could predict brief math achievement. As test anxiety increased, brief math achievement decreased ($a = 113.925$, 95% CI [103.238, 124.612], *B* = -0.300, 95% CI [-0.505, -0.095], β = -0.214, 95% CI [-0.359, -0.069]). The overall model was statistically significant, $F(1, 174) = 8.365$, $p = 0.004$.

Results show a negative correlation between attention and concentration difficulties and brief math achievement ($r = -0.221$, $p = 0.003$). Attention and concentration difficulties explain 4.9% of the variability in brief math achievement. A linear regression was used to determine if attention and concentration difficulties could predict brief math achievement. As attention and concentration difficulties increased, brief math achievement decreased ($a = 111.188$, 95% CI [102.601, 119.776], *B* = -0.252, 95% CI [-0.418, -0.086], β = -0.221, 95% CI [-0.366, -0.076]. The overall model was statistically significant, $F(1, 174) = 8.946$, $p = 0.003$.

Table 82
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Brief Math, Full Sample

SMALSI Scale	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.293	-0.423	-0.152	<0.001	0.086
Test Anxiety	-0.214	-0.351	-0.068	0.004	0.046
Concentration/ Attention Difficulties	-0.221	-0.357	-0.076	0.003	0.049

Math Calculation Skills

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 83. Scatterplots for these correlations are displayed in Appendix Figures C3g through C3i. For the full sample of participants, results show a negative correlation between low academic motivation and math calculation skills ($r = -0.233$, $p = 0.002$). Low academic motivation explains 5.4% of the variability in math calculation skills. A linear regression was used to determine if low academic motivation could predict math calculation skills. As low academic motivation increased, math calculation skills decreased ($a = 114.590$, 95% CI [105.159, 124.022], $B = -0.289$, 95% CI [-0.470, -0.109], $\beta = -0.233$, 95% CI [-0.378, -0.088]). The overall model was statistically significant, $F(1, 174) = 10.006$, $p = 0.002$.

Results show a negative correlation between test anxiety and math calculation skills ($r = -0.137$, $p = 0.070$). Test anxiety explains 1.9% of the variability in math calculation skills. A linear regression was used to determine if test anxiety could predict math calculation skills. As test anxiety increased, math calculation skills decreased ($a = 109.787$, 95% CI [98.837, 120.736], $B = -0.194$, 95% CI [-0.404, 0.016], $\beta = -0.137$, 95% CI [-0.284, 0.010]). The overall model was not statistically significant, $F(1, 174) = 3.330$, $p = 0.070$.

Results show a negative correlation between attention and concentration difficulties and math calculation skills ($r = -0.171$, $p = 0.023$). Attention and concentration difficulties explain 2.9% of the variability in math calculation skills. A linear regression was used to determine if attention and concentration difficulties could predict math calculation skills. As attention and concentration difficulties increased, math calculation skills decreased (a = 109.711, 95% CI [100.945, 118.476], B = -0.197, 95% CI [-0.366, -0.027], β = -0.171, 95% CI [-0.318, -0.024]. The overall model was not statistically significant, $F(1, 174) = 5.233$, $p = 0.023$.

Table 83
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Calculation Skills, Full Sample

SMALSI Scale	Math Calculation Skills	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.233	-0.368	-0.088	0.002	0.054
Test Anxiety	-0.137	-0.279	0.011	0.070	0.019
Concentration/ Attention Difficulties	-0.171	-0.311	-0.024	0.023	0.029

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the full sample of participants on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 84. Scatterplots for these correlations are displayed in Appendix Figures C4g through C4i. For the full sample of participants, results show a negative correlation between low academic motivation and math reasoning skills ($r = -0.360$, $p < 0.001$). Low academic motivation explains 12.9% of the variability in math reasoning skills. A linear regression was used to determine if low academic motivation could predict math reasoning skills. As low academic motivation increased, math reasoning skills decreased (*a* = 119.607, 95% CI [111.328, 127.887], *B* = -0.409, 95% CI [-0.568, -0.251], β = -0.360, 95% CI [-0.499, -0.221]). The overall model was statistically significant, $F(1, 174) = 25.962$, $p < 0.001$.

Results show a negative correlation between test anxiety and math reasoning skills ($r = -0.280$, $p < 0.001$). Test anxiety explains 7.8% of the variability in math reasoning skills. A linear regression was used to determine if test anxiety could predict math reasoning skills. As test anxiety increased, math reasoning skills decreased (*a* = 117.367, 95% CI [107.657, 127.077], *B* = -0.363, 95% CI [-0.550, -0.177], β = -0.280, 95% CI [-0.423, -0.137]). The overall model was statistically significant, $F(1, 174) = 14.851$, $p < 0.001$.

Results show a negative correlation between attention and concentration difficulties and math reasoning skills ($r = -0.262$, $p < 0.001$). Attention and concentration difficulties explain 6.7% of the variability in math reasoning skills. A linear regression was used to determine if attention and concentration difficulties could predict math reasoning skills. As attention and concentration difficulties increased, math reasoning skills decreased (*a* = 112.592, 95% CI [104.735, 120.449], *B* = -0.276, 95% CI [-0.428, -0.124], β = -0.262, 95% CI [-0.405, -0.119]). The overall model was statistically significant, $F(1, 174) = 12.805$, $p < 0.001$.

Table 84
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Reasoning, Full Sample

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.360	-0.482	-0.224	<0.001	0.129
Test Anxiety	-0.280	-0.411	-0.138	<0.001	0.078
Concentration/ Attention Difficulties	-0.262	-0.395	-0.119	<0.001	0.067

Third Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Third Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 85.

Table 85
Means for the Low Academic Motivation, Test Anxiety, Concentration/Attention Difficulties Scales of the SMALSI and the WJ-III Math Clusters, Third Graders (n=60)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Low Academic Motivation	50.83	11.627	47.888	53.772	Broad Math	98.22	17.862	93.700	102.739
Test Anxiety	51.40	8.716	49.195	53.605	Brief Math	97.93	17.727	93.445	102.415
Concentration/ Attention Difficulties	47.95	9.885	45.449	50.451	Math Calculation Skills	101.07	16.679	96.850	105.289
					Math Reasoning	97.87	15.387	93.977	101.763

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 86. Scatterplots for these correlations are displayed in Appendix Figures C5g through C5i. For participants in the Third Grade, results show a negative correlation between low academic motivation and broad math achievement (r = -0.251, p = 0.053). Low academic motivation explains 6.3% of the variability in broad math achievement. A linear regression was used to determine if low academic motivation could predict broad math achievement. As low academic motivation increased, broad math achievement decreased (a = 117.845, 95% CI [97.473, 138.216], B = -0.386, 95% CI [-0.777, 0.005], β = -0.251, 95% CI [-0.499, -0.002]). The overall model was not statistically significant, $F(1, 58) = 3.911$, p = 0.053.

Results show a negative correlation between test anxiety and broad math achievement

(r = -0.165, p = 0.207). Test anxiety explains 2.7% of the variability in broad math achievement. A linear regression was used to determine if test anxiety could predict broad math achievement. As test anxiety increased, broad math achievement decreased (a = 115.615, 95% CI [87.926, 143.303], B = -0.338, 95% CI [-0.870, 0.193], β = -0.165, 95% CI [-0.419, 0.090]). The overall model was not statistically significant, $F(1, 58) = 1.627$, p = 0.207.

Results show a negative correlation between attention and concentration difficulties and broad math achievement (r = -0.261, p = 0.044). Attention and concentration difficulties explain 6.8% of the variability in broad math achievement. A linear regression was used to determine if attention and concentration difficulties could predict broad math achievement. As attention and concentration difficulties increased, broad math achievement decreased (a = 120.860, 95% CI [98.423, 143.298], B = -0.472, 95% CI [-0.931, -0.014], β = -0.261, 95% CI [-0.509, -0.012]). The overall model was not statistically significant, $F(1, 58) = 4.251$, p = 0.044.

Table 86

Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Broad Math, Third Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.251	-0.475	-0.003	0.053	0.063
Test Anxiety	-0.165	-0.402	0.093	0.207	0.027
Concentration/ Attention Difficulties	-0.261	-0.483	-0.008	0.044	0.068

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the participants in the Third Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 87. Scatterplots for these correlations are displayed in Appendix Figures C6g through C6i. For participants in the Third Grade, results show a negative correlation between low academic motivation and brief math achievement ($r = -0.231$, $p = 0.076$). Low academic motivation explains 5.3% of the variability in brief math achievement. A linear regression was used to determine if low academic motivation could predict brief math achievement. As low academic motivation increased, brief math achievement decreased ($a = 115.833$, 95% CI [95.511, 136.156], $B = -0.352$, 95% CI [-0.742, 0.038], $\beta = -0.231$, 95% CI [-0.481, 0.020]). The overall model was not statistically significant, $F(1, 58) = 3.268$, $p = 0.076$.

Results show a negative correlation between test anxiety and brief math achievement ($r = -0.162$, $p = 0.216$). Test anxiety explains 2.6% of the variability in brief math achievement. A linear regression was used to determine if test anxiety could predict brief math achievement. As test anxiety increased, brief math achievement decreased ($a = 114.875$, 95% CI [87.382, 142.368], $B = -0.330$, 95% CI [-0.857, 0.198], $\beta = -0.162$, 95% CI [-0.416, 0.093]). The overall model was not statistically significant, $F(1, 58) = 1.564$, $p = 0.216$.

Results show a negative correlation between attention and concentration difficulties and brief math achievement ($r = -0.244$, $p = 0.060$). Attention and concentration difficulties explain 6.0% of the variability in brief math achievement. A linear regression was used to determine if attention and concentration difficulties could predict brief math achievement. As attention and concentration difficulties increased, brief math achievement decreased (*a* = 118.929, 95% CI [96.558, 141.299], *B* = -0.438, 95% CI [-0.895, 0.019], β = -0.244, 95% CI [-0.492, 0.005]). The overall model was not statistically significant, $F(1, 58) = 3.677$, $p = 0.060$.

Table 87
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Brief Math, Third Graders

SMALSI Scale	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.231	-0.458	0.024	0.076	0.053
Test Anxiety	-0.162	-0.399	0.096	0.216	0.026
Concentration/ Attention Difficulties	-0.244	-0.469	0.011	0.060	0.060

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 88. Scatterplots for these correlations are displayed in Appendix Figures C7g through C7i. For participants in the Third Grade, results show a negative correlation between low academic motivation and math calculation skills ($r = -0.257$, $p = 0.048$). Low academic motivation explains 6.6% of the variability in math calculation skills. A linear regression was used to determine if low academic motivation could predict math calculation skills. As low academic motivation increased, math calculation skills decreased (*a* = 119.799, 95% CI [100.805, 138.793], B = -0.369, 95% CI [-0.733, -0.004], β = -0.257, 95% CI [-0.505, -0.008]). The overall model was not statistically significant, $F(1, 58) = 4.098$, $p = 0.048$.

Results show a negative correlation between test anxiety and math calculation skills ($r = -0.188$, $p = 0.150$). Test anxiety explains 3.5% of the variability in math calculation skills. A linear regression was used to determine if test anxiety could predict math calculation skills. As test anxiety increased, math calculation skills decreased (a = 119.593, 95% CI [93.847, 145.339], B = -0.360, 95% CI [-0.854, 0.134], β = -0.188, 95% CI [-0.440, 0.065]). The overall model was not statistically significant, $F(1, 58) = 2.133$, $p = 0.150$.

Results show a negative correlation between attention and concentration difficulties and math calculation skills ($r = -0.277$, $p = 0.032$). Attention and concentration difficulties explain 7.7% of the variability in math calculation skills. A linear regression was used to determine if attention and concentration difficulties could predict math calculation skills. As attention and concentration difficulties increased, math calculation skills decreased (a = 123.489, 95% CI [102.634, 144.345], B = -0.468, 95% CI [-0.894, -0.041], β = -0.277, 95% CI [-0.523, -0.030]). The overall model was not statistically significant, $F(1, 58) = 4.825$, $p = 0.032$.

Table 88
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Calculation Skills, Third Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.257	-0.480	-0.003	0.048	0.066
Test Anxiety	-0.188	-0.422	0.069	0.150	0.035
Concentration/ Attention Difficulties	-0.277	-0.496	-0.025	0.032	0.077

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 89. Scatterplots for these correlations are displayed in Appendix Figures C8g through C8i. For participants in the Third Grade, results show a negative correlation between low academic motivation and math reasoning skills (r = -0.311, p = 0.016). Low academic motivation explains 9.7% of the variability in math reasoning skills. A linear regression was used to determine if low academic motivation could predict math reasoning skills. As low academic motivation increased, math reasoning skills decreased (a = 118.772, 95% CI [101.539, 136.005], B = -0.411, 95% CI [-0.742, -0.081], β = -0.311, 95% CI [-0.556, -0.066]). The overall model was not statistically significant, F(1, 58) = 6.200, p = 0.016.

Results show a negative correlation between test anxiety and math reasoning skills

(r = -0.201, p = 0.123). Test anxiety explains 4.1% of the variability in math reasoning skills. A linear regression was used to determine if test anxiety could predict math reasoning skills. As test anxiety increased, math reasoning skills decreased (a = 116.131, 95% CI [92.442, 139.821], B = -0.355, 95% CI [-0.810, 0.099], β = -0.201, 95% CI [-0.453, 0.052]). The overall model was not statistically significant, $F(1, 58) = 2.449$, p = 0.123.

Results show a negative correlation between attention and concentration difficulties and math reasoning skills (r = -0.273, p = 0.035). Attention and concentration difficulties explain 7.4% of the variability in math reasoning skills. A linear regression was used to determine if attention and concentration difficulties could predict math reasoning skills. As attention and concentration difficulties increased, math reasoning skills decreased (a = 118.207, 95% CI [98.940, 137.473], B = -0.424, 95% CI [-0.818, -0.031], β = -0.273, 95% CI [-0.519, -0.026]). The overall model was not statistically significant, $F(1, 58) = 4.653$, p = 0.035.

Table 89

Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Reasoning, Third Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.311	-0.524	-0.062	0.016	0.097
Test Anxiety	-0.201	-0.433	0.056	0.123	0.041
Concentration/ Attention Difficulties	-0.273	-0.493	-0.020	0.035	0.074

Fourth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fourth Grade on the Low Academic Motivation, Test Anxiety, Concentration/Attention Difficulties scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 90.

Table 90
Means for the Low Academic Motivation, Test Anxiety, Concentration/Attention Difficulties Scales of the SMALSI and the WJ-III Math Clusters, Fourth Graders (n=68)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Low Academic Motivation	50.51	12.941	47.434	53.585	Broad Math	98.35	10.792	95.784	100.916
Test Anxiety	49.63	10.953	47.027	52.233	Brief Math	97.24	10.511	94.741	99.739
Concentration/ Attention Difficulties	49.79	15.599	46.081	53.498	Math Calculation Skills	100.85	10.453	98.364	103.335
					Math Reasoning	98.37	9.922	96.012	100.728

<u>Broad Math</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 91. Scatterplots for these correlations are displayed in Appendix Figures C9g through C9i. For participants in the Fourth Grade, results show a negative correlation between low academic motivation and broad math achievement ($r = -0.377$, $p = 0.002$). Low academic motivation explains 14.2% of the variability in broad math achievement. A linear regression was used to determine if low academic motivation could predict broad math achievement. As low academic motivation increased, broad math achievement decreased ($a = 114.250$, 95% CI [104.358, 124.143], $B = -0.315$, 95% CI [-0.505, -0.125], $\beta = -0.377$, 95% CI [-0.600, -0.154]). The overall model was statistically significant, $F(1, 66) = 10.690$, $p = 0.002$.

Results show a negative correlation between test anxiety and broad math achievement ($r = -0.451$, $p < 0.001$). Test anxiety explains 20.4% of the variability in broad math achievement. A linear regression was used to determine if test anxiety could predict broad math achievement. As test anxiety increased, broad math achievement decreased ($a = 120.417$, 95% CI [109.437, 131.397], $B = -0.445$, 95% CI [-0.661, -0.228], $\beta = -0.451$, 95% CI [-0.667, -0.235]). The overall model was statistically significant, $F(1, 66) = 16.868$, $p < 0.001$.

Results show a negative correlation between attention and concentration difficulties and broad math achievement ($r = -0.296$, $p = 0.014$). Attention and concentration difficulties explain 8.8% of the variability in broad math achievement. A linear regression was used to determine if attention and concentration difficulties could predict broad math achievement. As attention and concentration difficulties increased, broad math achievement decreased (a = 108.564, 95% CI [100.096, 117.031], $B = -0.205$, 95% CI [-0.367, -0.043], $\beta = -0.296$, 95% CI [-0.527, -0.065]). The overall model was not statistically significant, $F(1, 66) = 6.356$, $p = 0.014$.

Table 91
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Broad Math, Fourth Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.377	-0.565	-0.152	0.002	0.142
Test Anxiety	-0.451	-0.622	-0.238	<0.001	0.204
Concentration/ Attention Difficulties	-0.296	-0.499	-0.062	0.014	0.088

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the participants in the Fourth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 92. Scatterplots for these correlations are displayed in Appendix Figures C10g through C10i. For participants in the Fourth Grade, results show a negative correlation between low academic motivation and brief math achievement (r = -0.378, p = 0.001). Low academic motivation explains 14.3% of the variability in brief math achievement. A linear regression was used to determine if low academic motivation could predict brief math achievement. As low academic motivation increased, brief math achievement decreased (a = 112.750, 95% CI [103.118, 122.381], B = -0.307, 95% CI [-0.492, -0.122], β = -0.378, 95% CI [-0.601, -0.155]). The overall model was statistically significant, $F(1, 66) = 11.012$, p = 0.001.

Results show a negative correlation between test anxiety and brief math achievement

(r = -0.459, p < 0.001). Test anxiety explains 21.1% of the variability in brief math achievement. A linear regression was used to determine if test anxiety could predict brief math achievement. As test anxiety increased, brief math achievement decreased (a = 119.089, 95% CI [108.442, 129.736], B = -0.440, 95% CI [-0.650, -0.231], β = -0.459, 95% CI [-0.672, -0.245]). The overall model was statistically significant, F(1, 66) = 17.599, p < 0.001.

Results show a negative correlation between attention and concentration difficulties and brief math achievement (r = -0.301, p = 0.013). Attention and concentration difficulties explain 9.1% of the variability in brief math achievement. A linear regression was used to determine if attention and concentration difficulties could predict brief math achievement. As attention and concentration difficulties increased, brief math achievement decreased (a = 107.344, 95% CI [99.110, 115.578], B = -0.203, 95% CI [-0.361, -0.045], β = -0.301, 95% CI [-0.530, -0.072]). The overall model was not statistically significant, F(1, 66) = 6.589, p = 0.013.

Table 92
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Brief Math, Fourth Graders

SMALSI Scale	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.378	-0.565	-0.153	0.001	0.143
Test Anxiety	-0.459	-0.629	-0.248	<0.001	0.211
Concentration/ Attention Difficulties	-0.301	-0.503	-0.067	0.013	0.091

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 93. Scatterplots for these correlations are displayed in Appendix Figures C11g through C11i. For participants in the Fourth Grade, results show a negative correlation between low academic motivation and math calculation skills (r = -0.183, p = 0.134). Low academic motivation explains 3.4% of the variability in math calculation skills. A linear regression was used to determine if low academic motivation could predict math calculation skills. As low academic motivation increased, math calculation skills decreased (a = 108.334, 95% CI [98.163, 118.505], B = -0.148, 95% CI [-0.343, 0.047], β = -0.183, 95% CI [-0.420, 0.054]). The overall model was not statistically significant, F(1, 66) = 2.296, p = 0.134.

Results show a negative correlation between test anxiety and math calculation skills (r = -0.222, p = 0.068). Test anxiety explains 5.0% of the variability in math calculation skills. A linear regression was used to determine if test anxiety could predict math calculation skills. As test anxiety increased, math calculation skills decreased (a = 111.391, 95% CI [99.773, 123.009], B = -0.212, 95% CI [-0.441, 0.016], β = -0.222, 95% CI [-0.457, 0.013]). The overall model was not statistically significant, F(1, 66) = 3.437, p = 0.068.

Results show a negative correlation between attention and concentration difficulties and math calculation skills (r = -0.115, p = 0.349). Attention and concentration difficulties explain 1.3% of the variability in math calculation skills. A linear regression was used to determine if attention and concentration difficulties could predict math calculation skills. As attention and concentration difficulties increased, math calculation skills decreased (*a* = 104.698, 95% CI [96.168, 113.229], *B* = -0.077, 95% CI [-0.241, 0.086], β= -0.115, 95% CI [-0.354, 0.124]). The overall model was not statistically significant, $F(1, 66) = 0.888$, $p = 0.349$.

Table 93
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Calculation Skills, Fourth Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.183	-0.404	0.058	0.134	0.034
Test Anxiety	-0.222	-0.437	0.017	0.068	0.050
Concentration/ Attention Difficulties	-0.115	-0.344	0.127	0.349	0.013

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 94. Scatterplots for these correlations are displayed in Appendix Figures C12g through C12i. For participants in the Fourth Grade, results show a negative correlation between low academic motivation and math reasoning skills ($r = -0.414$, $p < 0.001$). Low academic motivation explains 17.2% of the variability in math reasoning skills. A linear regression was used to determine if low academic motivation could predict math reasoning skills. As low academic motivation increased, math reasoning skills decreased (a = 114.411, 95% CI [105.473, 123.350], B = -0.318, 95% CI [-0.489, -0.146], β = -0.414, 95% CI [-0.633, -0.194]). The overall model was statistically significant, $F(1, 66) = 13.673$, $p < 0.001$.

Results show a negative correlation between test anxiety and math reasoning skills ($r = -0.536$, $p < 0.001$). Test anxiety explains 28.8% of the variability in math reasoning skills. A linear regression was used to determine if test anxiety could predict math reasoning skills. As test anxiety increased, broad math achievement decreased (a = 122.479, 95% CI [112.932, 132.027], B = -0.486, 95% CI [-0.674, -0.298], β = -0.536, 95% CI [-0.739, -0.332]). The overall model was statistically significant, $F(1, 66) = 26.645$, $p < 0.001$.

Results show a negative correlation between attention and concentration difficulties and math reasoning skills ($r = -0.339$, $p = 0.005$). Attention and concentration difficulties explain 11.5% of the variability in math reasoning skills. A linear regression was used to determine if attention and concentration difficulties could predict math reasoning skills. As attention and concentration difficulties increased, math problem solving and reasoning skills decreased (a = 109.103, 95% CI [101.434, 116.772], B = -0.216, 95% CI [-0.363, -0.069], β = -0.339, 95% CI [-0.566, -0.112]). The overall model was statistically significant, $F(1, 66) = 8.567$, $p = 0.005$.

Table 94
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Reasoning, Fourth Graders

SMALSI Scale	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.414	-0.594	-0.195	<0.001	0.172
Test Anxiety	-0.536	-0.687	-0.341	<0.001	0.288
Concentration/ Attention Difficulties	-0.339	-0.534	-0.109	0.005	0.115

Fifth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fifth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III are displayed in Table 95.

Table 95
Means for the Low Academic Motivation, Test Anxiety, Concentration/Attention Difficulties Scales of the SMALSI and the WJ-III Math Clusters, Fifth Graders (n=48)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Low Academic Motivation	51.48	10.531	48.500	54.459	Broad Math	99.56	16.358	94.932	104.188
Test Anxiety	52.94	11.235	49.760	56.119	Brief Math	98.88	16.374	94.248	103.512
Concentration/ Attention Difficulties	53.04	10.935	49.947	56.133	Math Calculation Skills	98.40	17.095	93.564	103.235
					Math Reasoning	99.83	13.417	96.033	103.627

Broad Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Broad Math cluster of the WJ-III are displayed in Table 96. Scatterplots for these correlations are displayed in Appendix Figures C13g through C13i. For participants in the Fifth Grade, results show a negative correlation between low academic motivation and broad math achievement (r = -0.308, p = 0.033). Low academic motivation explains 9.5% of the variability in broad math achievement. A linear regression was used to determine if low academic motivation could predict broad math achievement. As low academic motivation increased, broad math achievement decreased (a = 124.156, 95% CI [101.116, 147.196], B = -0.478, 95% CI [-0.916, -0.039], β = -0.308, 95% CI [-0.582, -0.034]). The overall model was not statistically significant, $F(1, 46) = 4.806$, p = 0.033.

Results show a negative correlation between test anxiety and broad math achievement

(r = -0.135, p = 0.361). Test anxiety explains 1.8% of the variability in broad math achievement. A linear regression was used to determine if test anxiety could predict broad math achievement. As test anxiety increased, broad math achievement decreased (a = 109.943, 95% CI [86.782, 133.103], B = -0.196, 95% CI [-0.624, 0.232], β = -0.135, 95% CI [-0.421, 0.151]). The overall model was not statistically significant, $F(1, 46) = 0.850$, $p = 0.361$.

Results show a negative correlation between attention and concentration difficulties and broad math achievement (r = -0.148, p = 0.316). Attention and concentration difficulties explain 2.2% of the variability in broad math achievement. A linear regression was used to determine if attention and concentration difficulties could predict broad math achievement. As attention and concentration difficulties increased, broad math achievement decreased (a = 111.816, 95% CI [87.516, 135.056], B = -0.221, 95% CI [-0.660, 0.218], β = -0.148, 95% CI [-0.434, 0.138]). The overall model was not statistically significant, $F(1, 46) = 1.027$, $p = 0.316$.

Table 96

Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Broad Math, Fifth Graders

SMALSI Scale	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.308	-0.544	-0.026	0.033	0.095
Test Anxiety	-0.135	-0.404	0.155	0.361	0.018
Concentration/ Attention Difficulties	-0.221	-0.475	0.067	0.316	0.022

Brief Math

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for the participants in the Fifth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Brief Math cluster of the WJ-III are displayed in Table 97. Scatterplots for these correlations are displayed in Appendix Figures C14g through C14i. For participants in the Fifth Grade, results show a negative correlation between low academic motivation and brief math achievement (r = -0.283, p = 0.051). Low academic motivation explains 8.0% of the variability in brief math achievement. A linear regression was used to determine if low academic motivation could predict brief math achievement. As low academic motivation increased, brief math achievement decreased (a = 121.544, 95% CI [98.298, 144.790], B = -0.440, 95% CI [-0.883, 0.002], β = -0.283, 95% CI [-0.559, -0.007]). The overall model was not statistically significant, F(1, 46) = 4.011, p = 0.051.

Results show a negative correlation between test anxiety and brief math achievement (r = -0.117, p = 0.429). Test anxiety explains 1.4% of the variability in brief math achievement. A linear regression was used to determine if test anxiety could predict brief math achievement. As test anxiety increased, brief math achievement decreased (a = 107.890, 95% CI [84.654, 131.127], B = -0.170, 95% CI [-0.600, 0.259], β = -0.117, 95% CI [-0.403, 0.169]). The overall model was not statistically significant, F(1, 46) = 0.637, p = 0.429.

Results show a negative correlation between attention and concentration difficulties and brief math achievement (r = -0.147, p = 0.320). Attention and concentration difficulties explain 2.1% of the variability in brief math achievement. A linear regression was used to determine if attention and concentration difficulties could predict brief math achievement. As attention and concentration difficulties increased, brief math achievement decreased (*a* = 110.519, 95% CI [86.722, 134.317], *B* = -0.220, 95% CI [-0.659, 0.220], β = -0.147, 95% CI [-0.433, 0.139]). The overall model was not statistically significant, $F(1, 46) = 1.010$, $p = 0.320$.

Table 97
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Brief Math, Fifth Graders

SMALSI Scale	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.283	-0.525	0.001	0.051	0.080
Test Anxiety	-0.117	-0.388	0.173	0.429	0.014
Concentration/ Attention Difficulties	-0.147	-0.414	0.143	0.320	0.021

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Calculation Skills cluster of the WJ-III are displayed in Table 98. Scatterplots for these correlations are displayed in Appendix Figures C15g through C15i. For participants in the Fifth Grade, results show a negative correlation between low academic motivation and math calculation skills ($r = -0.216$, $p = 0.140$). Low academic motivation explains 4.7% of the variability in math calculation skills. A linear regression was used to determine if low academic motivation could predict math calculation skills. As low academic motivation increased, math calculation skills decreased (*a* = 116.462, 95% CI [91.755, 141.169], B = -0.351, 95% CI [-0.821, 0.119], β = -0.216, 95% CI [-0.498, 0.066]). The overall model was not statistically significant, $F(1, 46) = 2.255$, $p = 0.140$.

Results show a negative correlation between test anxiety and math calculation skills ($r = -0.037$, $p = 0.804$). Test anxiety explains 0.1% of the variability in math calculation skills. A linear regression was used to determine if test anxiety could predict math calculation skills. As test anxiety increased, math calculation skills decreased (a = 101.357, 95% CI [76.946, 125.767], B = -0.056, 95% CI [-0.507, 0.395], β = -0.037, 95% CI [-0.325, 0.251]). The overall model was not statistically significant, $F(1, 46) = 0.062$, $p = 0.804$.

Results show a negative correlation between attention and concentration difficulties and math calculation skills ($r = -0.055$, $p = 0.708$). Attention and concentration difficulties explain 0.3% of the variability in math calculation skills. A linear regression was used to determine if attention and concentration difficulties could predict math calculation skills. As attention and concentration difficulties increased, math calculation skills decreased (a = 102.990, 95% CI [77.912, 128.069], B = -0.087, 95% CI [-0.550, 0.377], β= -0.055, 95% CI [-0.343, 0.233]). The overall model was not statistically significant, $F(1, 46) = 0.142$, $p = 0.708$.

Table 98
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Calculation Skills, Fifth Graders

SMALSI Scale	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Low Academic Motivation	-0.216	-0.471	0.073	0.140	0.047
Test Anxiety	-0.037	-0.318	0.250	0.804	0.001
Concentration/ Attention Difficulties	-0.055	-0.334	0.233	0.708	0.003

Math Reasoning

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI and the Math Reasoning cluster of the WJ-III are displayed in Table 99. Scatterplots for these correlations are displayed in Appendix Figures C16g through C16i. For participants in the Fifth Grade, results show a negative correlation between low academic motivation and math reasoning skills (r = -0.390, p = 0.006). Low academic motivation explains 15.2% of the variability in math reasoning skills. A linear regression was used to determine if low academic motivation could predict math reasoning skills. As low academic motivation increased, math reasoning skills decreased (a = 125.397, 95% CI [107.107, 143.687], B = -0.497, 95% CI [-0.845, -0.148], β = -0.390, 95% CI [-0.656, -0.123]). The overall model was statistically significant, F(1, 46) = 8.239, p = 0.006.

Results show a negative correlation between test anxiety and math reasoning skills

(r = -0.222, p = 0.129). Test anxiety explains 4.9% of the variability in math reasoning skills. A linear regression was used to determine if test anxiety could predict math reasoning skills. As test anxiety increased, math reasoning skills decreased (a = 113.873, 95% CI [95.181, 132.566], B = -0.265, 95% CI [-0.611, 0.080], β = -0.222, 95% CI [-0.504, 0.060]). The overall model was not statistically significant, $F(1, 46) = 2.387$, p = 0.129.

Results show a negative correlation between attention and concentration difficulties and math reasoning skills (r = -0.222, p = 0.130). Attention and concentration difficulties explain 4.9% of the variability in math reasoning skills. A linear regression was used to determine if attention and concentration difficulties could predict math reasoning skills. As attention and concentration difficulties increased, math reasoning skills decreased (a = 114.252, 95% CI [95.029, 133.475], B = -0.272, 95% CI [-0.627, 0.083], β = -0.222, 95% CI [-0.504, 0.060]). The overall model was not statistically significant, $F(1, 46) = 2.374$, p = 0.130.

Table 99
Correlations Between Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties with Math Reasoning, Fifth Graders

SMALSI Scale	Math Reasoning	95% Confidence Interval		p	r^2
		Lower	Upper		
Low Academic Motivation	-0.390	-0.607	-0.119	0.006	0.152
Test Anxiety	-0.222	-0.476	0.066	0.129	0.049
Concentration/ Attention Difficulties	-0.222	-0.476	0.067	0.130	0.049

Question Four

4.) Can school motivation and learning and study strategies as measured by scores on the nine scales of the SMALSI Child Form be used to predict math achievement as measured by the math cluster scores of the WJ-III?

According to the hypothesis for Question 4, the researcher proposed that there would be a positive relationship between the Study Strategies, Note Taking/Listening Skills, Reading/Comprehension Strategies, Writing/Research Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI Child Form and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III. In addition, there would be negative relationship between the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI Child Form and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III. Based on these relationships, the researcher hypothesized that school motivation and learning and study strategies as measured on the nine scales of the SMALSI Child Form could be used to predict math achievement as measured on the four math clusters of the WJ-III.

Question 4 was answered using full model multiple regression. Scores from the nine scales of the SMALSI were used as predictor variables and scores for each math cluster of the WJ-III were used as the criterion variable. To correct for any experiment-wise Type I error, the alpha level used was 0.05.

Full Sample

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the four math achievement clusters for the full sample of participants were correlated with each other. These correlation coefficients are displayed in Table 100. Because the four math clusters all measure the same or similar constructs, one would expect them to correlate highly with each other. As expected, the correlation coefficients for the Broad Math cluster with the other three clusters range from 0.914 to 0.986. The correlation coefficients for the Brief Math cluster with the other three clusters range from 0.867 to 0.986. The correlation coefficients for the Math Calculation Skills cluster with the other three clusters range from 0.742 to 0.914. The correlation coefficients for the Math Reasoning cluster with the other three clusters range from 0.742 to 0.936.

Table 100
Correlation Matrix for the WJ-III Math Achievement Clusters, Full Sample

WJ-III Cluster	Broad Math	Brief Math	Math Calculation Skills	Math Reasoning
Broad Math				
Brief Math	0.986			
Math Calculation Skills	0.914	0.867		
Math Reasoning	0.925	0.936	0.742	

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the nine scales of the SMALSI Child Form for the full sample of participants were correlated with each other. These correlation coefficients are displayed in Table 101. Because the nine scales of the SMALSI Child Form are designed to measure different constructs, one would expect them to have little or no relationship with each other. In multiple regression, it is important for there to be little or no correlation between predictor variables in order to minimize the presence of multicollinearity across predictor variables.

The correlation coefficients for the Study Strategies scale with the other nine scales range from -0.299 to 0.039. The correlation coefficients for the Note Taking/Listening Skills scale with the other nine scales range from -0.278 to 0.113. The correlation coefficients for the Reading/Comprehension Strategies scale with the other nine scales range from -0.299 to 0.096. The correlation coefficients for the Writing/Research Skills scale with the other nine scales range from -0.315 to 0.176. The correlation coefficients for the Test-Taking Strategies scale with the other nine scales range from -0.278 to 0.201. The correlation coefficients for the Time Management/Organizational Techniques scale with the other nine scales range from -0.315 to 0.005. The correlation coefficients for the Low Academic Motivation scale with the other nine scales range from -0.575 to 0.201. The correlation coefficients for the Test Anxiety scale with the other nine scales range from -0.290 to 0.176. The correlation coefficients for the Concentration/Attention Difficulties scale with the other nine scales range from -0.575 to 0.113.

Table 101

Correlation Matrix for the SMALSI Child Form, Full Sample

SMALSI Scale	Study Strategies	Note Taking/ Listening Skills	Reading/ Comprehension Strategies	Writing/ Research Skills	Test-Taking Strategies	Time Management/ Organizational Techniques	Low Academic Motivation	Test Anxiety	Concentration/ Attention Difficulties
Study Strategies									
Note Taking/ Listening Skills	-0.153								
Reading/ Compre-hension Strategies	-0.299	-0.240							
Writing/ Research Skills	-0.004	-0.156	-0.191						
Test-Taking Strategies	-0.181	-0.278	-0.197	-0.117					
Time Manage-ment/ Organiza-tional Techniques	-0.292	-0.007	-0.186	-0.315	-0.090				
Low Academic Motivation	0.039	0.058	-0.089	-0.033	0.201	0.002			
Test Anxiety	0.014	-0.026	-0.250	0.176	0.030	<0.001	-0.290		
Concen-tration/ Attention Difficulties	-0.097	0.113	0.096	-0.092	0.043	0.005	-0.575	-0.234	

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the full sample of participants on the nine scales of the SMALSI and the four math clusters of the WJ-III are displayed in Table 102.

Table 102

Means for the SMALSI Scales and the WJ-III Math Clusters, Full Sample (n=176)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Study Strategies	48.68	10.555	47.119	50.240	Broad Math	99.22	14.761	97.038	101.401
Note Taking/ Listening Skills	48.16	10.583	46.595	49.724	Brief Math	98.57	14.515	96.425	100.714
Reading/ Comprehension Strategies	49.27	10.683	47.692	50.848	Math Calculation Skills	99.86	14.665	97.694	102.026
Writing/ Research Skills	51.25	11.742	49.515	52.985	Math Reasoning	98.78	13.420	96.796	100.764
Test-Taking Strategies	50.95	11.235	49.284	52.616					
Time Management/ Organizational Techniques	47.64	9.925	46.173	49.106					
Low Academic Motivation	50.89	11.817	49.143	52.636					
Test Anxiety	51.14	10.356	49.609	52.671					
Concentration/ Attention Difficulties	50.05	12.736	48.168	51.932					

Broad Math

The results of a full model multiple regression are shown in Table 103. The full model R^2 was greater than zero and statistically significant, $F(9, 166) = 3.834$, $p < 0.001$, $R^2 = 0.172$. The nine predictors accounted for 17.2% of the variance in broad math achievement. Reading and comprehension strategies ($\beta = -0.415$, $p = 0.002$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.264$, $p = 0.017$), low academic motivation ($\beta = -0.276$, $p = 0.023$), time management and organizational techniques ($\beta = 0.121$, $p = 0.306$), test-taking strategies ($\beta = 0.075$, $p = 0.560$), test anxiety ($\beta = 0.029$, $p = 0.758$), note taking and listening skills ($\beta = -0.026$, $p = 0.834$), concentration and attention difficulties ($\beta = -0.018$, $p = 0.872$), and study strategies ($\beta = -0.003$, $p = 0.983$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.740$), concentration and attention difficulties ($r_s = -0.547$), test anxiety ($r_s = -0.535$), writing and research skills ($r_s = 0.404$), test-taking strategies ($r_s = 0.333$), time management and organizational techniques ($r_s = 0.262$), and note taking and listening skills ($r_s = 0.202$).

Table 103
Predictors of Broad Math Achievement (SMALSI), Full Sample

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.004	-0.346	0.338	-0.003	-0.246	0.240	0.983	0.104
Note Taking/ Listening Skills	-0.036	-0.372	0.301	-0.026	-0.265	0.213	0.834	0.202
Reading/ Comprehension Strategies	-0.573	-0.941	-0.205	-0.415	-0.679	-0.150	0.002	-0.141
Writing/ Research Skills	0.332	0.060	0.603	0.264	0.050	0.478	0.017	0.404
Test-Taking Strategies	0.098	-0.232	0.427	0.075	-0.176	0.326	0.560	0.333
Time Management/ Organizational Techniques	0.181	-0.167	0.528	0.121	-0.110	0.352	0.306	0.262
Low Academic Motivation	-0.344	-0.640	-0.049	-0.276	-0.511	-0.041	0.023	-0.740
Test Anxiety	0.041	-0.222	0.304	0.029	-0.153	0.211	0.758	-0.535
Concentration/ Attention Difficulties	-0.021	-0.282	0.240	-0.018	-0.241	0.205	0.872	-0.547

a (Constant)	95% Confidence Interval	
	Lower	Upper
115.276	95.897	134.655

Brief Math

The results of a full model multiple regression are shown in Table 104. The full model R^2 was greater than zero and statistically significant, $F(9, 166) = 3.488$, $p = 0.001$, $R^2 = 0.159$.

The nine predictors accounted for 15.9% of the variance in brief math achievement. Reading and comprehension strategies ($\beta = -0.417$, $p = 0.003$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.246$, $p = 0.027$), low academic motivation ($\beta = -0.256$, $p = 0.036$), time management and organizational techniques ($\beta = 0.098$, $p = 0.410$), test-taking strategies ($\beta = 0.085$, $p = 0.512$), test anxiety ($\beta = 0.032$, $p = 0.737$), concentration and attention difficulties ($\beta = -0.031$, $p = 0.789$), note taking and listening skills ($\beta = -0.019$, $p = 0.877$), and study strategies ($\beta = 0.001$, $p = 0.995$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.735$), concentration and attention difficulties ($r_s = -0.555$), test anxiety ($r_s = -0.537$), writing and research skills ($r_s = 0.358$), test-taking strategies ($r_s = 0.308$), and time management and organizational techniques ($r_s = 0.208$).

Table 104
Predictors of Brief Math Achievement (SMALSI), Full Sample

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	0.001	-0.338	0.340	0.001	-0.244	0.246	0.995	0.066
Note Taking/ Listening Skills	-0.026	-0.360	0.307	-0.019	-0.260	0.222	0.877	0.175
Reading/ Comprehension Strategies	-0.567	-0.932	-0.202	-0.417	-0.684	-0.150	0.003	-0.190
Writing/ Research Skills	0.305	0.036	0.573	0.246	0.030	0.462	0.027	0.358
Test-Taking Strategies	0.109	-0.218	0.436	0.085	-0.168	0.338	0.512	0.308
Time Management/ Organizational Techniques	0.144	-0.200	0.488	0.098	-0.135	0.331	0.410	0.208
Low Academic Motivation	-0.315	-0.608	-0.021	-0.256	-0.493	-0.019	0.036	-0.735
Test Anxiety	0.044	-0.216	0.305	0.032	-0.152	0.216	0.737	-0.537
Concentration/ Attention Difficulties	-0.035	-0.256	0.194	-0.031	-0.256	0.194	0.789	-0.555

a (Constant)	95% Confidence Interval	
	Lower	Upper
115.180	95.976	134.384

<u>Math Calculation Skills</u>

The results of a full model multiple regression are shown in Table 105. The full model R^2 was greater than zero and statistically significant, $F(9, 166) = 2.099$, $p = 0.032$, $R^2 = 0.102$. The nine predictors accounted for 10.2% of the variance in math calculation skills. Reading and comprehension strategies ($\beta = -0.300$, $p = 0.034$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.217$, $p = 0.058$), low academic motivation ($\beta = -0.208$, $p = 0.098$), time management and organizational techniques ($\beta = 0.108$, $p = 0.382$), test anxiety ($\beta = 0.054$, $p = 0.580$), note taking and listening skills ($\beta = 0.051$, $p = 0.688$), test-taking strategies ($\beta = 0.031$, $p = 0.813$), concentration and attention difficulties ($\beta = -0.005$, $p = 0.968$), and study strategies ($\beta = -0.001$, $p = 0.991$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.729$), writing and research skills ($r_s = 0.588$), concentration and attention difficulties ($r_s = -0.535$), test-taking strategies ($r_s = 0.480$), time management and organizational techniques ($r_s = 0.454$), note taking and listening skills ($r_s = 0.436$), test anxiety ($r_s = -0.429$), and study strategies ($r_s = 0.295$).

Table 105
Predictors of Math Calculation Skills (SMALSI), Full Sample

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.002	-0.356	0.352	-0.001	-0.254	0.252	0.991	0.295
Note Taking/ Listening Skills	0.071	-0.277	0.419	0.051	-0.198	0.299	0.688	0.436
Reading/ Comprehension Strategies	-0.412	-0.793	-0.031	-0.300	-0.239	-0.361	0.034	0.084
Writing/ Research Skills	0.271	-0.009	0.552	0.217	-0.006	0.440	0.058	0.588
Test-Taking Strategies	0.041	-0.300	0.382	0.031	-0.229	0.292	0.813	0.480
Time Management/ Organizational Techniques	0.159	-0.200	0.519	0.108	-0.133	0.349	0.382	0.454
Low Academic Motivation	-0.258	-0.564	0.048	-0.208	-0.453	0.037	0.098	-0.729
Test Anxiety	0.076	-0.196	0.348	0.054	-0.136	0.244	0.580	-0.429
Concentration/ Attention Difficulties	-0.005	-0.275	0.264	-0.005	-0.238	0.228	0.968	-0.535

a (Constant)	95% Confidence Interval	
	Lower	Upper
102.730	82.683	122.777

Math Reasoning

The results of a full model multiple regression are shown in Table 106. The full model R^2 was greater than zero and statistically significant, $F(9, 166) = 6.084$, $p = .000$, $R^2 = 0.248$. The nine predictors accounted for 24.8% of the variance in math reasoning skills. Reading and comprehension strategies ($\beta = -0.499$, $p < 0.001$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.304$, $p = 0.004$), low academic motivation ($\beta = -0.322$, $p = 0.005$), test-taking strategies ($\beta = 0.151$, $p = 0.217$), time management and organizational techniques ($\beta = 0.108$, $p = 0.339$), study strategies ($\beta = -0.056$, $p = 0.636$), note taking and listening skills ($\beta = -0.032$, $p = 0.784$), test anxiety ($\beta = 0.012$, $p = 0.896$), and concentration and attention difficulties ($\beta = -0.003$, $p = 0.980$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.724$), test anxiety ($r_s = -0.563$), concentration and attention difficulties ($r_s = -0.526$), writing and research skills ($r_s = 0.329$), test-taking strategies ($r_s = 0.298$), reading and comprehension strategies ($r_s = -0.225$), and time management and organizational techniques ($r_s = 0.159$).

Table 106
Predictors of Math Reasoning (SMALSI), Full Sample

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.071	-0.367	0.225	-0.056	-0.287	0.175	0.636	<0.001
Note Taking/ Listening Skills	-0.041	-0.332	0.251	-0.032	-0.259	0.195	0.784	0.138
Reading/ Comprehension Strategies	-0.627	-0.946	-0.308	-0.499	-0.752	-0.246	<0.001	-0.225
Writing/ Research Skills	0.348	0.113	0.583	0.304	0.100	0.508	0.004	0.329
Test-Taking Strategies	0.179	-0.107	0.465	0.151	-0.088	0.390	0.217	0.298
Time Management/ Organizational Techniques	0.146	-0.155	0.447	0.108	-0.113	0.329	0.339	0.159
Low Academic Motivation	-0.366	-0.622	-0.110	-0.322	-0.545	-0.099	0.005	-0.724
Test Anxiety	0.015	-0.213	0.243	0.012	-0.162	0.186	0.896	-0.563
Concentration/ Attention Difficulties	-0.003	-0.229	0.223	-0.003	-0.217	0.211	0.980	-0.526

a (Constant)	95% Confidence Interval	
	Lower	Upper
102.730	82.683	122.777

Third Grade

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the four math achievement clusters for participants in the Third Grade were

correlated with each other. These correlation coefficients are displayed in Table 107. The correlation coefficients for the Broad Math cluster with the other three clusters range from 0.931 to 0.994. The correlation coefficients for the Brief Math cluster with the other three clusters range from 0.911 to 0.994. The correlation coefficients for the Math Calculation Skills cluster with the other three clusters range from 0.795 to 0.931. The correlation coefficients for the Math Reasoning cluster with the other three clusters range from 0.795 to 0.937.

Table 107
Correlation Matrix for the WJ-III Math Achievement Clusters, Third Graders

WJ-III Cluster	Broad Math	Brief Math	Math Calculation Skills	Math Reasoning
Broad Math				
Brief Math	0.994			
Math Calculation Skills	0.931	0.911		
Math Reasoning	0.937	0.935	0.795	

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the nine scales of the SMALSI Child Form for participants in the Third Grade were correlated with each other. These correlation coefficients are displayed in Table 108. The correlation coefficients for the Study Strategies scale with the other nine scales range from -0.363 to 0.335. The correlation coefficients for the Note Taking/Listening Skills scale with the other nine scales range from -0.319 to 0.092. The correlation coefficients for the Reading/ Comprehension Strategies scale with the other nine scales range from -0.283 to 0.226. The correlation coefficients for the Writing/Research Skills scale with the other nine scales range from -0.283 to 0.136. The correlation coefficients for the Test-Taking Strategies scale with the

other nine scales range from -0.319 to 0.155. The correlation coefficients for the Time Management/Organizational Techniques scale with the other nine scales range from -0.316 to 0.092. The correlation coefficients for the Low Academic Motivation scale with the other nine scales range from -0.532 to 0.335. The correlation coefficients for the Test Anxiety scale with the other nine scales range from -0.370 to 0.136. The correlation coefficients for the Concentration/ Attention Difficulties scale with the other nine scales range from -0.532 to 0.226.

Table 108
Correlation Matrix for the SMALSI Child Form, Third Graders

SMALSI Scale	Study Strategies	Note Taking/ Listening Skills	Reading/ Comprehension Strategies	Writing/ Research Skills	Test-Taking Strategies	Time Management/ Organizational Techniques	Low Academic Motivation	Test Anxiety	Concentration/ Attention Difficulties
Study Strategies									
Note Taking/ Listening Skills	-0.143								
Reading/ Compre-hension Strategies	-0.264	-0.224							
Writing/ Research Skills	-0.247	-0.032	-0.283						
Test-Taking Strategies	-0.276	-0.319	-0.182	-0.012					
Time Manage-ment/ Organiza-tional Techniques	-0.316	-0.005	-0.032	-0.213	-0.139				
Low Academic Motivation	0.335	0.023	-0.110	-0.079	0.013	-0.058			
Test Anxiety	-0.006	0.092	-0.227	0.136	-0.051	-0.153	-0.234		
Concen-tration/ Attention Difficulties	-0.363	0.039	0.226	-0.022	0.155	0.092	-0.532	-0.370	

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Third Grade on the nine scales of the SMALSI and the four math clusters of the WJ-III are displayed in Table 109.

Table 109
Means for the SMALSI Scales and the WJ-III Math Clusters, Third Graders (n=60)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Study Strategies	48.83	11.104	46.021	51.637	Broad Math	98.22	17.862	93.700	102.739
Note Taking/ Listening Skills	48.70	11.159	45.875	51.524	Brief Math	97.93	17.727	93.445	102.415
Reading/ Comprehension Strategies	49.70	11.072	46.899	52.501	Math Calculation Skills	101.07	16.679	96.850	105.289
Writing/ Research Skills	48.70	11.550	45.777	51.622	Math Reasoning	97.87	15.387	93.977	101.763
Test-Taking Strategies	51.48	11.223	48.639	54.320					
Time Management/ Organizational Techniques	45.83	9.370	43.458	48.202					
Low Academic Motivation	50.83	11.717	47.888	53.772					
Test Anxiety	51.40	8.716	49.195	53.605					
Concentration/ Attention Difficulties	47.95	9.885	45.449	50.451					

Broad Math

The results of a full model multiple regression are shown in Table 110. The full model R^2 was greater than zero but was not found statistically significant, $F(9, 50) = 2.061$, $p = 0.051$, $R^2 = 0.271$. The nine predictors accounted for 27.1% of the variance in broad math achievement. Reading and comprehension strategies ($\beta = -0.707$, $p = 0.005$) was the most influential predictor variable, followed by test-taking strategies ($\beta = 0.407$, $p = 0.085$), time management and organizational techniques ($\beta = 0.221$, $p = 0.276$), low academic motivation ($\beta = -0.187$, $p = 0.313$), concentration and attention difficulties ($\beta = -0.190$, $p = 0.324$), writing and research skills ($\beta = 0.181$, $p = 0.377$), study strategies ($\beta = -0.227$, $p = 0.413$), test anxiety ($\beta = 0.111$, $p = 0.504$), and note taking and listening skills ($\beta = 0.014$, $p = 0.944$). According to the structure coefficients, the most important predictor variables are concentration and attention difficulties ($r_s = -0.502$), low academic motivation ($r_s = -0.483$), reading and comprehension strategies ($r_s = -0.375$), and test anxiety ($r_s = -0.318$).

Table 110
Predictors of Broad Math Achievement (SMALSI), Third Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.365	-1.255	0.524	-0.227	-0.766	0.312	0.413	-0.146
Note Taking/ Listening Skills	0.023	-0.625	0.671	0.014	-0.382	0.409	0.944	-0.009
Reading/ Comprehension Strategies	-1.140	-1.913	-0.367	-0.707	-1.175	-0.239	0.005	-0.375
Writing/ Research Skills	0.279	-0.350	0.908	0.181	-0.214	0.577	0.377	-0.044
Test-Taking Strategies	0.648	-0.094	1.389	0.407	-0.048	0.862	0.085	0.157
Time Management/ Organizational Techniques	0.422	-0.348	1.192	0.221	-0.173	0.615	0.276	0.070
Low Academic Motivation	-0.287	-0.852	0.278	-0.187	-0.546	0.172	0.313	-0.483
Test Anxiety	0.228	-0.452	0.907	0.111	-0.212	0.434	0.504	-0.318
Concentration/ Attention Difficulties	-0.344	-1.036	0.349	-0.190	-0.564	0.184	0.324	-0.502

a (Constant)	95% Confidence Interval	
	Lower	Upper
124.683	88.007	161.359

Brief Math

The results of a full model multiple regression are shown in Table 111. The full model R^2 was greater than zero but was not statistically significant, $F(9, 50) = 1.746$, $p = 0.103$, $R^2 = 0.239$. The nine predictors accounted for 23.9% of the variance in brief math achievement. Reading and comprehension strategies ($\beta = -0.690$, $p = 0.007$) was the most influential predictor variable, followed by test-taking strategies ($\beta = 0.342$, $p = 0.155$), concentration and attention difficulties ($\beta = -0.191$, $p = 0.331$), low academic motivation ($\beta = -0.171$, $p = 0.366$), writing and research skills ($\beta = 0.185$, $p = 0.375$), time management and organizational techniques ($\beta = 0.180$, $p = 0.384$), study strategies ($\beta = -0.186$, $p = 0.511$), test anxiety ($\beta = -0.110$, $p = 0.515$), and note taking and listening skills ($\beta = 0.035$, $p = 0.866$). According to the structure coefficients, the most important predictor variables are concentration and attention difficulties ($r_s = -0.499$), low academic motivation ($r_s = -0.472$), and reading and comprehension strategies ($r_s = -0.428$).

Table 111
Predictors of Brief Math Achievement (SMALSI), Third Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.297	-1.199	0.605	-0.186	-0.736	0.365	0.511	-0.186
Note Taking/ Listening Skills	0.055	-0.601	0.712	0.035	-0.368	0.439	0.866	-0.038
Reading/ Comprehension Strategies	-1.105	-1.889	-0.321	-0.690	-1.168	-0.212	0.007	-0.428
Writing/ Research Skills	0.284	-0.353	0.922	0.185	-0.220	0.591	0.375	-0.076
Test-Taking Strategies	0.540	-0.212	1.292	0.342	-0.122	0.807	0.155	0.095
Time Management/ Organizational Techniques	0.341	-0.439	1.121	0.180	-0.221	0.582	0.384	0.012
Low Academic Motivation	-0.260	-0.833	0.313	-0.171	-0.537	0.196	0.366	-0.472
Test Anxiety	0.225	-0.464	0.914	-0.110	-0.221	0.441	0.515	-0.331
Concentration/ Attention Difficulties	-0.343	-1.044	0.359	-0.191	-0.573	0.191	0.331	-0.499

a (Constant)	95% Confidence Interval	
	Lower	Upper
125.539	88.365	162.712

<u>Math Calculation Skills</u>

The results of a full model multiple regression are shown in Table 112. The full model R^2 was greater than zero but was not statistically significant, $F(9, 50) = 1.581$, $p= 0.147$, $R^2= 0.222$. The nine predictors accounted for 22.2% of the variance in math calculation skills. Reading and comprehension strategies ($\beta= -0.495$, $p= 0.050$) was the most influential predictor variable, followed by test-taking strategies ($\beta= 0.385$, $p= 0.115$), study strategies ($\beta= -0.355$, $p = 0.218$), time management and organizational techniques ($\beta = 0.258$, $p = 0.220$), low academic motivation ($\beta = -0.154$, $p = 0.420$), writing and research skills ($\beta = 0.159$, $p = 0.449$), concentration and attention difficulties ($\beta = -0.134$, $p = 0.499$), note taking and listening skills ($\beta = 0.097$, $p = 0.644$), and test anxiety ($\beta = 0.014$, $p = 0.934$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.589$), concentration and attention difficulties ($r_s = -0.499$), test anxiety ($r_s = -0.400$), and test taking strategies ($r_s = 0.346$).

Table 112
Predictors of Math Calculation Skills (SMALSI), Third Graders

SMALSI Scale	**b**	**95% Confidence Interval**		**β weights**	**95% Confidence Interval**		**p**	**r_s**
		Lower	**Upper**		**Lower**	**Upper**		
Study Strategies	-0.533	-1.391	0.325	-0.355	-0.911	0.202	0.218	-0.025
Note Taking/ Listening Skills	0.145	-0.480	0.770	0.097	-0.310	0.505	0.644	0.227
Reading/ Comprehension Strategies	-0.746	-1.492	0.000	-0.495	-0.979	-0.011	0.050	-0.141
Writing/ Research Skills	0.230	-0.376	0.837	0.159	-0.250	0.567	0.449	0.119
Test-Taking Strategies	0.572	-0.144	1.287	0.385	-0.085	0.855	0.115	0.346
Time Management/ Organizational Techniques	0.459	-0.284	1.201	0.258	-0.149	0.666	0.220	0.236
Low Academic Motivation	-0.221	-0.766	0.324	-0.154	-0.524	0.216	0.420	-0.546
Test Anxiety	0.027	-0.628	0.683	0.014	-0.321	0.349	0.934	-0.400
Concentration/ Attention Difficulties	-0.226	-0.894	0.442	-0.134	-0.520	0.252	0.499	-0.589

a (Constant)	**95% Confidence Interval**	
	Lower	**Upper**
116.122	80.744	151.500

Math Reasoning

The results of a full model multiple regression are shown in Table 113. The full model R^2 was greater than zero and statistically significant, $F(9, 50) = 3.435$, $p = 0.002$, $R^2 = 0.382$. The nine predictors accounted for 38.2% of the variance in math reasoning skills. Reading and comprehension strategies ($\beta = -0.843$, $p < 0.001$) was the most influential predictor variable, followed by test-taking strategies ($\beta = 0.479$, $p = 0.029$), low academic motivation ($\beta = -0.296$, $p = 0.085$), time management and organizational techniques ($\beta = 0.243$, $p = 0.195$), writing and research skills ($\beta = 0.214$, $p = 0.257$), study strategies ($\beta = -0.245$, $p = 0.338$), concentration and attention difficulties ($\beta = -0.143$, $p = 0.419$), test anxiety ($\beta = 0.118$, $p = 0.440$), and note taking and listening skills ($\beta = -0.033$, $p = 0.861$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.503$), concentration and attention difficulties ($r_s = -0.441$), reading and comprehension strategies ($r_s = -0.432$), and test anxiety ($r_s = -0.326$).

Table 113
Predictors of Math Reasoning (SMALSI), Third Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.340	-1.045	0.365	-0.245	-0.740	0.251	0.338	-0.171
Note Taking/ Listening Skills	-0.045	-0.559	0.469	-0.033	-0.395	0.329	0.861	-0.081
Reading/ Comprehension Strategies	-1.171	-1.784	-0.558	-0.843	-1.274	-0.412	<0.001	-0.432
Writing/ Research Skills	0.284	-0.214	0.783	0.214	-0.150	0.579	0.257	-0.085
Test-Taking Strategies	0.657	0.069	1.245	0.479	0.059	0.898	0.029	0.102
Time Management/ Organizational Techniques	0.400	-0.211	1.010	0.243	-0.119	0.606	0.195	0.020
Low Academic Motivation	-0.392	-0.840	0.056	-0.296	-0.627	0.035	0.085	-0.503
Test Anxiety	0.209	-0.330	0.748	0.118	-0.179	0.416	0.440	-0.326
Concentration/ Attention Difficulties	-0.223	-0.772	0.326	-0.143	-0.487	0.202	0.419	-0.441

a (Constant)	95% Confidence Interval	
	Lower	Upper
128.757	99.678	157.836

Fourth Grade

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the four math achievement clusters for participants in the Fourth Grade were

correlated with each other. These correlation coefficients are displayed in Table 114. The correlation coefficients for the Broad Math cluster with the other three clusters range from 0.780 to 0.956. The correlation coefficients for the Brief Math cluster with the other three clusters range from 0.611 to 0.956. The correlation coefficients for the Math Calculation Skills cluster with the other three clusters range from 0.447 to 0.780. The correlation coefficients for the Math Reasoning cluster with the other three clusters range from 0.447 to 0.905.

Table 114
Correlation Matrix for the WJ-III Math Achievement Clusters, Fourth Graders

WJ-III Cluster	Broad Math	Brief Math	Math Calculation Skills	Math Reasoning
Broad Math				
Brief Math	0.956			
Math Calculation Skills	0.780	0.611		
Math Reasoning	0.866	0.905	0.447	

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the nine scales of the SMALSI Child Form for participants in the Fourth Grade were correlated with each other. These correlation coefficients are displayed in Table 115. The correlation coefficients for the Study Strategies scale with the other nine scales range from -0.337 to 0.166. The correlation coefficients for the Note Taking/Listening Skills scale with the other nine scales range from -0.320 to 0.143. The correlation coefficients for the Reading/ Comprehension Strategies scale with the other nine scales range from -0.357 to 0.232. The correlation coefficients for the Writing/Research Skills scale with the other nine scales range from -0.395 to 0.372. The correlation coefficients for the Test-Taking Strategies scale with the

other nine scales range from -0.325 to 0.356. The correlation coefficients for the Time Management/Organizational Techniques scale with the other nine scales range from -0.395 to 0.194. The correlation coefficients for the Low Academic Motivation scale with the other nine scales range from -0.744 to 0.356. The correlation coefficients for the Test Anxiety scale with the other nine scales range from -0.335 to 0.372. The correlation coefficients for the Concentration/ Attention Difficulties scale with the other nine scales range from -0.744 to 0.232.

Table 115

Correlation Matrix for the SMALSI Child Form, Fourth Graders

SMALSI Scale	Study Strategies	Note Taking/ Listening Skills	Reading/ Comprehension Strategies	Writing/ Research Skills	Test-Taking Strategies	Time Management/ Organizational Techniques	Low Academic Motivation	Test Anxiety	Concentration/ Attention Difficulties
Study Strategies									
Note Taking/ Listening Skills	-0.320								
Reading/ Compre-hension Strategies	-0.337	-0.154							
Writing/ Research Skills	0.166	-0.287	-0.004						
Test-Taking Strategies	-0.012	-0.160	-0.325	-0.282					
Time Manage-ment/ Organiza-tional Techniques	-0.268	0.000	-0.357	-0.395	0.033				
Low Academic Motivation	-0.035	0.084	-0.302	-0.211	0.356	0.194			
Test Anxiety	0.080	-0.019	-0.186	0.372	-0.063	-0.060	-0.335		
Concen-tration/ Attention Difficulties	-0.072	0.143	0.232	-0.050	-0.075	-0.096	-0.744	-0.011	

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fourth Grade on the nine scales of the SMALSI and the four math clusters of the WJ-III are displayed in Table 116.

Table 116
Means for the SMALSI Scales and the WJ-III Math Clusters, Fourth Graders (n=68)

SMALSI Scale	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Study Strategies	49.82	10.309	47.370	52.270	Broad Math	98.35	10.792	95.784	100.916
Note Taking/ Listening Skills	48.66	10.810	46.090	51.229	Brief Math	97.24	10.511	94.741	99.739
Reading/ Comprehension Strategies	49.97	10.316	47.518	52.422	Math Calculation Skills	100.85	10.453	98.364	103.335
Writing/ Research Skills	54.24	12.675	51.227	57.253	Math Reasoning	98.37	9.922	96.012	100.728
Test-Taking Strategies (n=68)	51.97	11.712	49.186	54.573					
Time Management/ Organizational Techniques (n=68)	50.57	10.816	47.998	53.141					
Low Academic Motivation (n=68)	50.51	12.941	47.434	53.585					
Test Anxiety (n=68)	49.63	10.953	47.027	52.233					
Concentration/ Attention Difficulties (n=68)	49.79	15.599	46.081	53.498					

Broad Math

The results of a full model multiple regression are shown in Table 117. The full model R^2 was greater than zero and statistically significant, $F(9, 58) = 4.011$, $p = 0.001$, $R^2 = 0.384$. The nine predictors accounted for 38.4% of the variance in broad math. Writing and research skills ($\beta = 0.545$, $p = 0.003$) was the most influential predictor variable, followed by note taking and listening skills ($\beta = -0.336$, $p = 0.097$), low academic motivation ($\beta = -0.404$, $p = 0.110$), test anxiety ($\beta = -0.186$, $p = 0.198$), test-taking strategies ($\beta = -0.216$, $p = 0.269$), study strategies ($\beta = -0.132$, $p = 0.464$), concentration and attention difficulties ($\beta = -0.041$, $p = 0.852$), reading and comprehension strategies ($\beta = -0.018$, $p = 0.935$), and time management and organizational techniques ($\beta = -0.014$, $p = 0.946$). According to the structure coefficients, the most important predictor variables are test anxiety ($r_s = -0.728$), low academic motivation ($r_s = -0.609$), concentration and attention difficulties ($r_s = -0.479$), and writing and research skills ($r_s = 0.458$).

Table 117
Predictors of Broad Math Achievement (SMALSI), Fourth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.138	-0.513	0.237	-0.132	-0.483	0.218	0.464	-0.174
Note Taking/ Listening Skills	-0.336	-0.735	0.063	-0.336	-0.728	0.056	0.097	0.053
Reading/ Comprehension Strategies	-0.018	-0.468	0.431	-0.018	-0.439	0.403	0.935	-0.146
Writing/ Research Skills	0.464	0.162	0.766	0.545	0.198	0.892	0.003	0.458
Test-Taking Strategies	-0.199	-0.556	0.158	-0.216	-0.596	0.164	0.269	0.174
Time Management/ Organizational Techniques	-0.014	-0.411	0.384	-0.014	-0.404	0.376	0.946	0.118
Low Academic Motivation	-0.337	-0.752	0.078	-0.404	-0.892	0.084	0.110	-0.609
Test Anxiety	-0.183	-0.465	0.099	-0.186	-0.466	0.094	0.198	-0.728
Concentration/ Attention Difficulties	-0.028	-0.332	0.275	-0.041	-0.470	0.388	0.852	-0.479

a (Constant)	95% Confidence Interval	
	Lower	Upper
135.917	113.363	158.471

Brief Math

The results of a full model multiple regression are shown in Table 118. The full model R^2 was greater than zero and statistically significant, $F(9, 58) = 3.843$, $p = 0.001$, $R^2 = 0.374$. The nine predictors accounted for 37.4% of the variance in brief math. Writing and research skills ($\beta = 0.491$, $p = 0.008$) was the most influential predictor variable, followed by note taking and listening skills ($\beta = -0.339$, $p = 0.098$), test anxiety ($\beta = -0.214$, $p = 0.143$), low academic motivation ($\beta = -0.360$, $p = 0.157$), test-taking strategies ($\beta = -0.183$, $p = 0.353$), study strategies ($\beta = -0.120$, $p = 0.507$), concentration and attention difficulties ($\beta = -0.071$, $p = 0.750$), reading and comprehension strategies ($\beta = -0.041$, $p = 0.851$), and time management and organizational techniques ($\beta = -0.011$, $p = 0.957$). According to the structure coefficients, the most important predictor variables are test anxiety ($r_s = -0.751$), low academic motivation ($r_s = -0.619$), concentration and attention difficulties ($r_s = -0.493$), and writing and research skills ($r_s = 0.411$).

Table 118
Predictors of Brief Math Achievement (SMALSI), Fourth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.123	-0.491	0.246	-0.120	-0.472	0.233	0.507	-0.196
Note Taking/ Listening Skills	-0.329	-0.721	0.062	-0.339	-0.732	0.055	0.098	0.027
Reading/ Comprehension Strategies	-0.042	-0.483	0.400	-0.041	-0.464	0.382	0.851	-0.183
Writing/ Research Skills	0.407	0.111	0.703	0.491	0.140	0.842	0.008	0.411
Test-Taking Strategies	-0.164	-0.514	0.187	-0.183	-0.565	0.199	0.353	0.161
Time Management/ Organizational Techniques	-0.011	-0.401	0.379	-0.011	-0.403	0.381	0.957	0.083
Low Academic Motivation	-0.292	-0.700	0.115	-0.360	-0.851	0.132	0.157	-0.619
Test Anxiety	-0.205	-0.482	0.072	-0.214	-0.437	0.009	0.143	-0.751
Concentration/ Attention Difficulties	-0.048	-0.345	0.250	-0.071	-0.504	0.362	0.750	-0.493

a (Constant)	95% Confidence Interval	
	Lower	Upper
135.739	113.595	157.883

Math Calculation Skills

The results of a full model multiple regression are shown in Table 119. The full model R^2 was greater than zero but was not statistically significant, $F(9, 58) = 1.242$, $p = 0.288$, $R^2 = 0.162$. The nine predictors accounted for 16.2% of the variance in math calculation skills. Writing and research skills ($\beta = 0.453$, $p = 0.032$) was the most influential predictor variable, followed by low academic motivation ($\beta = -0.371$, $p = 0.206$), test-taking strategies ($\beta = -0.224$, $p = 0.325$), note taking and listening skills ($\beta = -0.221$, $p = 0.346$), study strategies ($\beta = -0.126$, $p = 0.549$), concentration and attention difficulties ($\beta = 0.082$, $p = 0.750$), test anxiety ($\beta = -0.039$, $p = 0.816$), reading and comprehension strategies ($\beta = 0.039$, $p = 0.875$), and time management and organizational techniques ($\beta = -0.029$, $p = 0.903$). According to the structure coefficients, the most important predictor variables are test anxiety ($r_s = -0.554$), low academic motivation ($r_s = -0.456$), writing and research skills ($r_s = 0.476$), concentration and attention difficulties ($r_s = -0.287$), and study strategies ($r_s = -0.252$).

Table 119
Predictors of Math Calculation Skills (SMALSI), Fourth Graders

SMALSI Scale	B	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.128	-0.551	0.296	-0.126	-0.535	0.284	0.549	-0.252
Note Taking/ Listening Skills	-0.214	-0.665	0.237	-0.221	-0.677	0.236	0.346	-0.034
Reading/ Comprehension Strategies	0.040	-0.468	0.547	0.039	-0.451	0.529	0.875	-0.171
Writing/ Research Skills	0.374	0.033	0.715	0.453	0.047	0.859	0.032	0.476
Test-Taking Strategies	-0.200	-0.603	0.203	-0.224	-0.666	0.219	0.325	0.051
Time Management/ Organizational Techniques	-0.028	-0.476	0.421	-0.029	-0.483	0.426	0.903	0.077
Low Academic Motivation	-0.300	-0.769	0.169	-0.371	-0.939	0.197	0.206	-0.456
Test Anxiety	-0.037	-0.356	0.281	-0.039	-0.366	0.288	0.816	-0.554
Concentration/ Attention Difficulties	0.055	-0.288	0.397	0.082	-0.417	0.582	0.750	-0.287

a (Constant)	95% Confidence Interval	
	Lower	Upper
121.410	95.931	146.888

Math Reasoning

The results of a full model multiple regression are shown in Table 120. The full model R^2 was greater than zero and statistically significant, $F(9, 58) = 5.703$, $p < 0.001$, $R^2 = 0.470$. The nine predictors accounted for 47.0% of the variance in math reasoning. Writing and research skills ($\beta = 0.495$, $p = 0.004$) was the most influential predictor variable, followed by test anxiety ($\beta = -0.275$, $p = 0.042$), study strategies ($\beta = -0.189$, $p = 0.259$), reading and comprehension strategies ($\beta = -0.203$, $p = 0.313$), note taking and listening skills ($\beta = -0.188$, $p = 0.313$), low academic motivation ($\beta = -0.234$, $p = 0.315$), concentration and attention difficulties ($\beta = -0.129$, $p = 0.527$), test-taking strategies ($\beta = -0.096$, $p = 0.595$), and time management and organizational techniques ($\beta = -0.020$, $p = 0.916$). According to the structure coefficients, the most important predictor variables are test anxiety ($r_s = -0.783$), low academic motivation ($r_s = -0.605$), concentration and attention difficulties ($r_s = -0.495$), writing and research skills ($r_s = 0.409$), reading and comprehension strategies ($r_s = -0.246$), and study strategies ($r_s = -0.239$).

Table 120
Predictors of Math Reasoning (SMALSI), Fourth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	-0.182	-0.502	0.138	-0.189	-0.514	0.136	0.259	-0.239
Note Taking/ Listening Skills	-0.173	-0.513	0.167	-0.188	-0.550	0.175	0.313	0.080
Reading/ Comprehension Strategies	-0.195	-0.578	0.188	-0.203	-0.593	0.187	0.313	-0.246
Writing/ Research Skills	0.388	0.130	0.645	0.495	0.173	0.816	0.004	0.409
Test-Taking Strategies	-0.081	-0.386	0.223	-0.096	-0.448	0.257	0.595	0.185
Time Management/ Organizational Techniques	-0.018	-0.357	0.321	-0.020	-0.380	0.341	0.916	0.039
Low Academic Motivation	-0.179	-0.534	0.175	-0.234	-0.686	0.219	0.315	-0.605
Test Anxiety	-0.250	-0.490	-0.009	-0.275	-0.535	-0.014	0.042	-0.783
Concentration/ Attention Difficulties	-0.082	-0.341	0.176	-0.129	-0.526	0.269	0.527	-0.495

a (Constant)	95% Confidence Interval	
	Lower	Upper
135.221	115.983	154.458

Fifth Grade

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the four math achievement clusters for participants in the Fifth Grade were

correlated with each other. These correlation coefficients are displayed in Table 121. The correlation coefficients for the Broad Math cluster with the other three clusters range from 0.930 to 0.990. The correlation coefficients for the Brief Math cluster with the other three clusters range from 0.919 to 0.990. The correlation coefficients for the Math Calculation Skills cluster with the other three clusters range from 0.797 to 0.947. The correlation coefficients for the Math Reasoning cluster with the other three clusters range from 0.797 to 0.936.

Table 121
Correlation Matrix for the WJ-III Math Achievement Clusters, Fifth Graders

WJ-III Cluster	Broad Math	Brief Math	Math Calculation Skills	Math Reasoning
Broad Math				
Brief Math	0.990			
Math Calculation Skills	0.947	0.919		
Math Reasoning	0.930	0.936	0.797	

Correlation coefficients were calculated to determine the degree to which the mean scores obtained on the nine scales of the SMALSI Child Form for participants in the Fifth Grade were correlated with each other. These correlation coefficients are displayed in Table 122. The correlation coefficients for the Study Strategies scale with the other nine scales range from -0.412 to 0.213. The correlation coefficients for the Note Taking/Listening Skills scale with the other nine scales range from -0.406 to 0.171. The correlation coefficients for the Reading/ Comprehension Strategies scale with the other nine scales range from -0.413 to 0.067. The correlation coefficients for the Writing/Research Skills scale with the other nine scales range from -0.413 to 0.252. The correlation coefficients for the Test-Taking Strategies scale with the

other nine scales range from -0.412 to 0.278. The correlation coefficients for the Time Management/Organizational Techniques scale with the other nine scales range from -0.325 to 0.037. The correlation coefficients for the Low Academic Motivation scale with the other nine scales range from -0.427 to 0.278. The correlation coefficients for the Test Anxiety scale with the other nine scales range from -0.427 to 0.151. The correlation coefficients for the Concentration/ Attention Difficulties scale with the other nine scales range from -0.378 to 0.252.

Table 122
Correlation Matrix for the SMALSI Child Form, Fifth Graders

SMALSI Scale	Study Strategies	Note Taking/ Listening Skills	Reading/ Comprehension Strategies	Writing/ Research Skills	Test-Taking Strategies	Time Management/ Organizational Techniques	Low Academic Motivation	Test Anxiety	Concentration/ Attention Difficulties
Study Strategies									
Note Taking/ Listening Skills	0.091								
Reading/ Compre-hension Strategies	-0.174	-0.329							
Writing/ Research Skills	-0.104	-0.066	-0.413						
Test-Taking Strategies	-0.412	-0.406	-0.062	-0.013					
Time Manage-ment/ Organiza-tional Techniques	-0.325	-0.037	-0.297	-0.028	-0.057				
Low Academic Motivation	-0.189	0.022	0.067	0.120	0.278	-0.033			
Test Anxiety	0.024	-0.175	-0.058	-0.288	0.151	0.037	-0.427		
Concen-tration/ Attention Difficulties	0.213	0.171	-0.207	0.252	-0.151	-0.058	-0.376	-0.378	

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for participants in the Fifth Grade on the nine scales of the SMALSI and the four math clusters of the WJ-III are displayed in Table 123.

Table 123
Means for the SMALSI Scales and the WJ-III Math Clusters, Fifth Graders (n=48)

SMALSI Scale	**Mean**	**Standard Deviation**	**95% Confidence Interval**		**WJ-III Cluster**	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Study Strategies	46.85	10.180	43.974	49.725	Broad Math	99.56	16.358	94.932	104.188
Note Taking/ Listening Skills	46.79	9.563	44.085	49.495	Brief Math	98.88	16.374	94.248	103.512
Reading/ Comprehension Strategies	47.73	10.770	44.684	50.776	Math Calculation Skills	98.40	17.095	93.564	103.235
Writing/ Research Skills	50.21	9.726	47.458	52.962	Math Reasoning	99.83	13.417	96.033	103.627
Test-Taking Strategies	51.97	11.712	49.186	54.753					
Time Management/ Organizational Techniques	50.57	10.816	47.998	53.141					
Low Academic Motivation	51.48	10.531	48.500	54.459					
Test Anxiety	52.94	11.235	49.760	56.119					
Concentration/ Attention Difficulties	53.04	10.935	49.947	56.133					

Broad Math

The results of a full model multiple regression are shown in Table 124. The full model R^2 was greater than zero and statistically significant, $F(9, 38) = 3.100$, $p = 0.007$, $R^2 = 0.423$. The nine predictors accounted for 42.3% of the variance in broad math. Reading and comprehension strategies ($\beta = -0.836$, $p = 0.002$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.497$, $p = 0.022$), study strategies ($\beta = 0.442$, $p = 0.051$), concentration and attention difficulties ($\beta = 0.394$, $p = 0.053$), low academic motivation ($\beta = -0.362$, $p = 0.095$), time management and organizational techniques ($\beta = 0.269$, $p = 0.176$), note taking and listening skills ($\beta = 0.238$, $p = 0.275$), test-taking strategies ($\beta = -0.118$, $p = 0.623$), and test anxiety ($\beta = -0.093$, $p = 0.642$). According to the structure coefficients, the most important predictor variables are study strategies ($r_s = 0.632$), writing and research skills ($r_s = 0.574$), time management and organizational techniques ($r_s = 0.540$), test-taking strategies ($r_s = 0.523$), low academic motivation ($r_s = -0.473$), and note taking and listening skills ($r_s = 0.460$).

Table 124
Predictors of Broad Math Achievement (SMALSI), Fifth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	0.711	-0.004	1.427	0.442	0.011	0.873	0.051	0.632
Note Taking/ Listening Skills	0.408	-0.338	1.153	0.238	-0.183	0.659	0.275	0.460
Reading/ Comprehension Strategies	-1.270	-2.054	-0.486	-0.836	-1.335	-0.336	0.002	0.249
Writing/ Research Skills	0.836	0.130	1.542	0.497	0.091	0.903	0.022	0.574
Test-Taking Strategies	-0.181	-0.922	0.560	-0.118	-0.584	0.348	0.623	0.523
Time Management/ Organizational Techniques	0.529	-0.248	1.306	0.269	-0.115	0.653	0.176	0.540
Low Academic Motivation	-0.563	-1.277	0.102	-0.362	-0.775	0.052	0.095	-0.473
Test Anxiety	-0.136	-0.723	0.451	-0.093	-0.483	0.297	0.642	-0.207
Concentration/ Attention Difficulties	0.590	-0.007	1.187	0.394	0.008	0.780	0.053	-0.221

a (Constant)	95% Confidence Interval	
	Lower	Upper
55.343	11.960	98.726

Brief Math

The results of a full model multiple regression are shown in Table 125. The full model R^2 was greater than zero and statistically significant, $F(9, 38) = 2.700$, $p = 0.016$, $R^2 = 0.390$. The nine predictors accounted for 39.0% of the variance in brief math. Reading and comprehension strategies ($\beta = -0.843$, $p = 0.003$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.484$, $p = 0.029$), study strategies ($\beta = 0.391$, $p = 0.091$), concentration and attention difficulties ($\beta = 0.342$, $p = 0.100$), low academic motivation ($\beta = -0.311$, $p = 0.161$), time management and organizational techniques ($\beta = 0.275$, $p = 0.180$), note taking and listening skills ($\beta = 0.220$, $p = 0.327$), test anxiety ($\beta = -0.061$, $p = 0.766$), and test-taking strategies ($\beta = -0.046$, $p = 0.853$). According to the structure coefficients, the most important predictor variables are study strategies ($r_s = 0.627$), writing and research skills ($r_s = 0.576$), time management and organizational techniques ($r_s = 0.545$), test-taking strategies ($r_s = 0.543$), note taking and listening skills ($r_s = 0.464$), and low academic motivation ($r_s = -0.453$).

Table 125
Predictors of Brief Math Achievement (SMALSI), Fifth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	0.630	-0.107	1.367	0.391	-0.051	0.834	0.091	0.627
Note Taking/ Listening Skills	0.376	-0.391	1.144	0.220	-0.213	0.653	0.327	0.464
Reading/ Comprehension Strategies	-1.282	-2.090	-0.474	-0.843	-1.356	-0.329	0.003	0.236
Writing/ Research Skills	0.815	0.088	1.543	0.484	0.066	0.901	0.029	0.576
Test-Taking Strategies	-0.070	-0.833	0.693	-0.046	-0.526	0.434	0.853	0.543
Time Management/ Organizational Techniques	0.539	-0.261	1.339	0.275	-0.118	0.669	0.180	0.545
Low Academic Motivation	-0.483	-1.167	0.201	-0.311	-0.736	0.114	0.161	-0.453
Test Anxiety	-0.090	-0.694	0.515	-0.061	-0.462	0.341	0.766	-0.187
Concentration/ Attention Difficulties	0.512	-0.103	1.127	0.342	-0.055	0.739	0.100	-0.235

a (Constant)	95% Confidence Interval	
	Lower	Upper
53.223	8.560	97.886

Math Calculation Skills

The results of a full model multiple regression are shown in Table 126. The full model R^2 was greater than zero and statistically significant, $F(9, 38) = 3.134$, $p = 0.006$, $R^2 = 0.426$. The nine predictors accounted for 42.6% of the variance in math calculation skills. Reading and comprehension strategies ($\beta = -0.820$, $p = 0.002$) was the most influential predictor variable, followed by concentration and attention difficulties ($\beta = 0.458$, $p = 0.025$), writing and research skills ($\beta = 0.480$, $p = 0.026$), study strategies ($\beta = 0.499$, $p = 0.028$), note taking and listening skills ($\beta = 0.340$, $p = 0.121$), low academic motivation ($\beta = -0.328$, $p = 0.128$), time management and organizational techniques ($\beta = 0.264$, $p = 0.184$), test-taking strategies ($\beta = -0.212$, $p = 0.378$), and test anxiety ($\beta = -0.075$, $p = 0.708$). According to the structure coefficients, the most important predictor variables are study strategies ($r_s = 0.647$), writing and research skills ($r_s = 0.583$), time management and organizational techniques ($r_s = 0.568$), note taking and listening skills ($r_s = 0.508$), test-taking strategies ($r_s = 0.476$), low academic motivation ($r_s = -0.331$), and reading and comprehension strategies ($r_s = 0.297$).

Table 126
Predictors of Math Calculation Skills (SMALSI), Fifth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	0.839	0.093	1.586	0.499	0.069	0.928	0.028	0.647
Note Taking/ Listening Skills	0.608	-0.169	1.386	0.340	-0.081	0.761	0.121	0.508
Reading/ Comprehension Strategies	-1.315	-2.133	-0.497	-0.820	-1.319	-0.320	0.002	0.297
Writing/ Research Skills	0.844	0.107	1.580	0.480	0.074	0.886	0.026	0.583
Test-Taking Strategies	-0.340	-1.113	0.432	-0.212	-0.678	0.254	0.378	0.476
Time Management/ Organizational Techniques	0.541	-0.269	1.351	0.264	-0.118	0.646	0.184	0.568
Low Academic Motivation	-0.532	-1.225	0.160	-0.328	-0.741	0.086	0.128	-0.331
Test Anxiety	-0.114	-0.726	0.498	-0.075	-0.465	0.315	0.708	-0.056
Concentration/ Attention Difficulties	0.715	0.093	1.338	0.458	0.071	0.844	0.025	-0.085

a (Constant)	95% Confidence Interval	
	Lower	Upper
38.362	-6.870	83.595

Math Reasoning

The results of a full model multiple regression are shown in Table 127. The full model R^2 was greater than zero and statistically significant, $F(9, 38) = 2.972$, $p = 0.009$, $R^2 = 0.413$. The nine predictors accounted for 41.3% of the variance in math reasoning. Reading and comprehension strategies ($\beta = -0.730$, $p = 0.008$) was the most influential predictor variable, followed by writing and research skills ($\beta = 0.492$, $p = 0.026$), low academic motivation ($\beta = -0.366$, $p = 0.100$), concentration and attention difficulties ($\beta = 0.332$, $p = 0.110$), study strategies ($\beta = 0.285$, $p = 0.214$), time management and organizational techniques ($\beta = 0.226$, $p = 0.268$), note taking and listening skills ($\beta = 0.158$, $p = 0.478$), test anxiety ($\beta = -0.131$, $p = 0.525$), and test-taking strategies ($\beta = 0.019$, $p = 0.938$). According to the structure coefficients, the most important predictor variables are low academic motivation ($r_s = -0.622$), test-taking strategies ($r_s = 0.602$), study strategies ($r_s = 0.588$), writing and research skills ($r_s = 0.586$), time management and organizational techniques ($r_s = 0.503$), note taking and listening skills ($r_s = 0.462$), test anxiety ($r_s = -0.354$), and concentration and attention difficulties ($r_s = -0.354$).

Table 127
Predictors of Math Reasoning (SMALSI), Fifth Graders

SMALSI Scale	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Study Strategies	0.376	-0.226	0.978	0.285	-0.156	0.726	0.214	0.588
Note Taking/ Listening Skills	0.222	-0.406	0.850	0.158	-0.275	0.591	0.478	0.462
Reading/ Comprehension Strategies	-0.909	-1.570	-0.249	-0.730	-1.243	-0.216	0.008	0.253
Writing/ Research Skills	0.679	0.084	1.273	0.492	0.074	0.909	0.026	0.586
Test-Taking Strategies	0.024	-0.600	0.648	0.019	-0.459	0.497	0.938	0.602
Time Management/ Organizational Techniques	0.364	-0.291	1.018	0.226	-0.167	0.619	0.268	0.503
Low Academic Motivation	-0.466	-1.026	0.093	-0.366	-0.791	0.059	0.100	-0.622
Test Anxiety	-0.157	-0.651	0.337	-0.131	-0.530	0.269	0.525	-0.354
Concentration/ Attention Difficulties	0.407	-0.096	0.910	0.332	-0.063	0.728	0.110	-0.354

a (Constant)	95% Confidence Interval	
	Lower	Upper
74.053	37.536	110.569

Question Five

5.) What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a norm-referenced measure of math achievement, such as the WJ-III?

According to the hypothesis for Question 5, the researcher proposed that there would be a positive relationship between scores on the AIMSweb Math Computation Winter Benchmark and the four math clusters of the WJ-III. There would also be a positive relationship between scores on the AIMSweb Concepts and Applications Winter Benchmark and the four math clusters of the WJ-III. Based on these relationships, the researcher hypothesized that both AIMSweb Winter Benchmarks could be used to explain or predict math achievement as measured on the four math clusters of the WJ-III.

Question 5 was answered using the Pearson r, linear regression, and full model multiple regression. First, Pearson r coefficients were calculated using the scores for the AIMSweb Computation and AIMSweb Concepts and Applications Winter Benchmarks as predictor variables and the scores for each math cluster of the WJ-III as the criterion variable. The coefficient of determinism, r squared or r^2, was calculated to determine how much variability within each math cluster was explained by each of the AIMSweb Winter Benchmarks. Then, linear regression was used to determine the degree to which scores obtained on each of the AIMSweb Winter Benchmarks can be used to predict scores for each math cluster of the WJ-III. Finally, a full model multiple regression was used to determine how using scores from both Winter Benchmarks explained or predicted scores on the four math cluster scores of the WJ-III. To correct for any experiment-wise Type I error, the alpha level used was 0.01 for the Pearson r coefficients and the linear regression. The alpha level used was 0.05 for the full model multiple regression.

Third Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the sample of participants in the Third Grade on the AIMSweb Computation Winter Benchmark, the AIMSWeb Concepts and Applications Winter Benchmark, and the four clusters of the WJ-III are displayed in Table 128.

Table 128
Means for the AIMSweb Winter Benchmarks and the WJ-III Math Clusters, Third Graders (n=57)

AIMSweb Winter Benchmark	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Computation	50.02	21.708	44.385	55.655	Broad Math	99.95	14.876	96.112	103.788
Concepts and Applications	46.18	21.955	40.480	51.879	Brief Math	99.65	14.672	95.841	103.458
					Math Calculation Skills	102.93	13.520	99.419	106.440
					Math Reasoning	99.11	13.874	95.507	102.713

A correlation coefficient was calculated to determine the degree to which the mean scores on the AIMSweb Computation Winter Benchmark correlate with the mean scores on the AIMSweb Concepts and Applications Winter Benchmark. The correlation coefficient for the two AIMSweb Winter Benchmarks is -0.547.

Broad Math

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the AIMSweb Winter Benchmarks and the Broad Math cluster of the WJ-III are displayed in Table 129. Scatterplots for these correlations are displayed in Appendix Figures C17a and C17b. For participants in the Third Grade, results show a positive correlation between math fluency as measured by the AIMSweb Computation Winter Benchmark and broad math achievement ($r = 0.749$, $p < 0.001$). Math fluency explains 56.1% of the variability in broad math achievement. A linear regression was used to determine if math fluency could predict broad math achievement. As math fluency increased, broad math achievement increased ($a = 74.287$, 95% CI [67.602, 80.973], $B = 0.513$, 95% CI [0.390, 0.636], $\beta = 0.749$, 95% CI [0.574, 0.923]). The overall model did prove statistically significant, $F(1, 55) = 70.121$, $p < 0.001$.

Results show a positive correlation between math problem solving as measured by the AIMSweb Concepts and Applications Winter Benchmark and broad math achievement ($r = 0.667$, $p < 0.001$). Math problem solving explains 44.5% of the variability in broad math achievement. A linear regression was used to determine if math problem solving could predict broad math achievement. As math problem solving increased, broad math achievement increased ($a = 79.093$, 95% CI [72.126, 86.060], $B = 0.452$, 95% CI [0.315, 0.588], $\beta = 0.667$, 95% CI [0.469, 0.865]). The overall model did prove statistically significant, $F(1, 55) = 43.974$, $p < 0.001$.

Table 129
Correlations Between AIMSweb Winter Benchmarks with WJ-III Broad Math, Third Graders

AIMSweb Winter Benchmark	Broad Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Computation	0.749	0.607	0.845	<0.001	0.561
Concepts and Applications	0.667	0.492	0.790	<0.001	0.445

The results of a full model multiple regression are shown in Table 130. The full model R^2 was greater than zero and was statistically significant, $F(2, 54) = 51.237$, $p < 0.001$, $R^2 = 0.655$. The two predictors accounted for 65.5% of the variance in broad math achievement. Math fluency ($\beta = 0.548$, $p < 0.001$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.367$, $p < 0.001$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.925$), followed by math problem solving ($r_s = 0.824$).

Table 130
Predictors of Broad Math Achievement (AIMSweb), Third Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.376	0.244	0.507	0.548	0.361	0.734	<0.001	0.925
Concepts and Applications	0.249	0.119	0.378	0.367	0.180	0.553	<0.001	0.824

a (Constant)	95% Confidence Interval	
	Lower	Upper
69.680	63.235	76.125

Brief Math

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the AIMSweb Winter Benchmarks and the Brief Math cluster of the WJ-III are displayed in Table 131. Scatterplots for these correlations are displayed in Appendix Figures C17c and C17d. For participants in the Third Grade, results show a positive correlation between math fluency and brief math achievement ($r = 0.711$, $p < 0.001$). Math fluency explains 50.6% of the variability in brief math achievement. A linear regression was used to determine if math fluency could predict brief achievement. As math fluency increased, brief math increased ($a = 75.605$, 95% CI [68.615, 82.596], $B = 0.481$, 95% CI [0.352, 0.609], $\beta = 0.711$, 95% CI [0.524, 0.897]). The overall model did prove statistically significant, $F(1 ,55) = 56.301$, $p < 0.001$.

Results show a positive correlation between math problem solving and brief math achievement ($r = 0.654$, $p < 0.001$). Math problem solving explains 42.8% of the variability in brief math achievement. A linear regression was used to determine if math problem solving could predict brief achievement. As math problem solving increased, brief math increased ($a = 79.482$, 95% CI [72.505, 86.459], $B = 0.437$, 95% CI [0.300, 0.573], $\beta = 0.654$, 95% CI [0.454, 0.854]). The overall model did prove statistically significant, $F(1, 55) = 41.007$, $p < 0.001$.

Table 131
Correlations Between AIMSweb Winter Benchmarks with WJ-III Brief Math, Third Graders

AIMSweb Winter Benchmark	Brief Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Computation	0.711	0.553	0.820	<0.001	0.506
Concepts and Applications	0.654	0.474	0.781	<0.001	0.428

The results of a full model multiple regression are shown in Table 132. The full model R^2 was greater than zero and was statistically significant, $F(2, 54) = 41.501$, $p < 0.001$, $R^2 = 0.606$. The two predictors accounted for 60.6% of the variance in brief math achievement. Math fluency ($\beta = 0.505$, $p < 0.001$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.378$, $p = 0.001$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.914$), followed by math problem solving ($r_s = 0.840$).

Table 132
Predictors of Brief Math Achievement (AIMSweb), Third Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.341	0.203	0.479	0.505	0.305	0.705	<0.001	0.914
Concepts and Applications	0.252	0.116	0.389	0.378	0.178	0.578	0.001	0.840

a (Constant)	95% Confidence Interval	
	Lower	Upper
70.930	64.137	77.724

<u>Math Calculation Skills</u>

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the AIMSweb Winter Benchmarks and the Math Calculation Skills cluster of the WJ-III are displayed in Table 133. Scatterplots for these correlations are displayed in Appendix Figures C17e and C17f. For participants in the Third Grade, results show a positive correlation between math fluency and math calculation skills ($r = 0.655$, $p < 0.001$). Math fluency explains 42.9% of the variability in math calculation skills. A linear regression was used to determine if math fluency could predict math calculation skills. As math fluency increased, math calculation skills increased ($a = 82.512$, 95% CI [75.592, 89.433], $B = 0.408$, 95% CI [0.281, 0.535], $\beta = 0.655$, 95% CI [0.455, 0.855]). The overall model did prove statistically significant, $F(1, 55) = 41.422$, $p < 0.001$.

Results show a positive correlation between math problem solving and math calculation skills ($r = 0.498$, $p < 0.001$). Math problem solving explains 24.8% of the variability in math calculation skills. A linear regression was used to determine if math problem solving could predict math calculation skills. As math problem solving increased, math calculation skills increased ($a = 88.782$, 95% CI [81.414, 96.150], $B = 0.306$, 95% CI [0.162, 0.451], $\beta = 0.498$, 95% CI [0.268, 0.727]). The overall model did prove statistically significant, $F(1, 55) = 18.096$, $p < 0.001$.

Table 133
Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Calculation Skills, Third Graders

AIMSweb Winter Benchmark	Math Calculation Skills	95% Confidence Interval		p	r^2
		Lower	Upper		
Computation	0.655	0.476	0.782	<0.001	0.429
Concepts and Applications	0.498	0.273	0.671	<0.001	0.248

The results of a full model multiple regression are shown in Table 134. The full model R^2 was greater than zero and was statistically significant, $F(2, 54) = 22.749$, $p < 0.001$, $R^2 = 0.457$. The two predictors accounted for 45.7% of the variance in math calculation skills. Math fluency ($\beta = 0.547$, $p < 0.001$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.199$, $p = 0.103$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.969$), followed by math problem solving ($r_s = 0.736$).

Table 134
Predictors of Math Calculation Skills (AIMSweb), Third Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.341	0.191	0.490	0.547	0.311	0.782	<0.001	0.969
Concepts and Applications	0.122	-0.025	0.270	0.199	-0.036	0.434	0.103	0.736

a (Constant)	95% Confidence Interval	
	Lower	Upper
80.246	72.901	87.591

Math Reasoning

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third Grade on the AIMSweb Winter Benchmarks and the Math Reasoning cluster of the WJ-III are displayed in Table 135. Scatterplots for these correlations are displayed in Appendix Figures C17g and C17h. For participants in the Third Grade, results show a positive correlation between math fluency and math reasoning ($r = 0.721$, $p < 0.001$). Math fluency explains 51.9% of the variability in math reasoning. A linear regression was used to determine if math fluency could predict math reasoning. As math fluency increases, math reasoning increased ($a = 76.050$, 95% CI [69.536, 82.564], $B = 0.461$, 95% CI [0.341, 0.581], $\beta = 0.721$, 95% CI [0.538, 0.903]). The overall model did prove statistically significant, $F(1, 55) = 59.619$, $p < 0.001$.

Results show a positive correlation between math problem solving and math reasoning ($r = 0.779$, $p < 0.001$). Math problem solving explains 60.7% of the variability in math reasoning. A linear regression was used to determine if math problem solving could predict math reasoning. As math problem solving increases, math reasoning increased ($a = 76.365$, 95% CI [70.903, 81.827], $B = 0.492$, 95% CI [0.385, 0.599], $\beta = 0.779$, 95% CI [0.614, 0.944]). The overall model did prove statistically significant, $F(1, 55) = 85.076$, $p < 0.001$.

Table 135
Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Reasoning, Third Graders

AIMSweb Winter Benchmark	Math Reasoning	95% Confidence Interval		p	r^2
		Lower	Upper		
Computation	0.721	0.567	0.826	<0.001	0.519
Concepts and Applications	0.779	0.650	0.864	<0.001	0.607

The results of a full model multiple regression are shown in Table 136. The full model R^2 was greater than zero and was statistically significant, $F(2, 54) = 73.623$, $p < 0.001$, $R^2 = 0.732$. The two predictors accounted for 73.2% of the variance in math reasoning. Math problem solving ($\beta = 0.549$, $p < 0.001$) was the most influential predictor variable, followed by math fluency ($\beta = 0.421$, $p < 0.001$). According to the structure coefficients, the most influential predictor was math problem solving ($r_s = 0.911$), followed by math fluency ($r_s = 0.843$).

Table 136
Predictors of Math Reasoning (AIMSweb), Third Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.269	0.161	0.377	0.421	0.256	0.586	<0.001	0.843
Concepts and Applications	0.347	0.240	0.454	0.549	0.384	0.714	<0.001	0.911

a (Constant)	95% Confidence Interval	
	Lower	Upper
69.620	64.320	74.921

Fourth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the sample of participants in the Fourth Grade on the AIMSweb Computation Winter Benchmark, the AIMSweb Concepts and Applications Winter Benchmark, and the four clusters of the WJ-III are displayed in Table 137.

Table 137
Means for the AIMSweb Winter Benchmarks and the WJ-III Math Clusters, Fourth Graders (n=67)

AIMSweb Winter Benchmark	Mean	Standard Deviation	95% Confidence Interval		WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Computation	49.43	21.852	44.198	54.661	Broad Math	98.18	10.777	95.598	100.761
Concepts and Applications	50.21	23.092	34.167	66.253	Brief Math	97.00	10.408	94.507	99.493
					Math Calculation Skills	100.85	10.532	98.327	103.373
					Math Reasoning	98.24	9.939	95.860	100.619

A correlation coefficient was calculated to determine the degree to which the mean scores on the AIMSweb Computation Winter Benchmark correlate with the mean scores on the AIMSweb Concepts and Applications Winter Benchmark. The correlation coefficient for the two AIMSweb Winter Benchmarks is -0.552.

Broad Math

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth

Grade on the AIMSweb Winter Benchmarks and the Broad Math cluster of the WJ-III are displayed in Table 138. Scatterplots for these correlations are displayed in Appendix Figures C18a and C18b. For participants in the Fourth Grade, results show a positive correlation between math fluency and broad math achievement (r = 0.689, p < 0.001). Math fluency explains 47.5% of the variability in broad math achievement. A linear regression was used to determine if math fluency could predict broad math achievement. As math fluency increased, broad math achievement increased (a =81.370, 95% CI [76.593, 86.147], B = 0.340, 95% CI [0.252, 0.429], β = 0.689, 95% CI [0.512, 0.865]). The overall model did prove statistically significant, $F(1, 65) = 58.897$, $p < 0.001$.

Results show a positive correlation between math problem solving and broad math achievement (r = 0.479, p < 0.001). Math problem solving explains 22.9% of the variability in broad math achievement. A linear regression was used to determine if math problem solving could predict broad math achievement. As math problem solving increased, broad math achievement increased (a = 86.958, 95% CI [81.356, 92.559], B = 0.223, 95% CI [0.122, 0.325], β = 0.479, 95% CI [0.265, 0.693]). The overall model did prove statistically significant, $F(1, 65) = 19.341$, $p < 0.001$.

Table 138
Correlations Between AIMSweb Winter Benchmarks with WJ-III Broad Math, Fourth Graders

AIMSweb Winter Benchmark	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.689	0.538	0.797	<0.001	0.475
Concepts and Applications	0.479	0.270	0.645	<0.001	0.229

The results of a full model multiple regression are shown in Table 139. The full model R^2 was greater than zero and was statistically significant, $F(2, 64) = 30.651$, $p < 0.001$, $R^2 = 0.489$. The two predictors accounted for 48.9% of the variance in broad math achievement. Math fluency ($\beta = 0.611$, $p < 0.001$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.141$, $p = 0.192$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.986$), followed by math problem solving ($r_s = 0.685$).

Table 139
Predictors of Broad Math Achievement (AIMSweb), Fourth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.302	0.196	0.407	0.611	0.401	0.821	<0.001	0.986
Concepts and Applications	0.066	-0.034	0.166	0.141	-0.069	0.351	0.192	0.685

a (Constant)	95% Confidence Interval	
	Lower	Upper
79.962	74.753	85.171

Brief Math

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the AIMSweb Winter Benchmarks and Brief Math cluster of the WJ-III are displayed in Table 140. Scatterplots for these correlations are displayed in Appendix Figures C18c and C18d. For participants in the Fourth Grade, results show a positive correlation between math fluency and brief math achievement ($r = 0.576$, $p < 0.001$). Math fluency explains 33.2% of the variability in brief math achievement. A linear regression was used to determine if math fluency could predict brief achievement. As math fluency increased, brief math increased (*a* = 83.442, 95% CI [78.235, 88.649], *B* = 0.274, 95% CI [0.178, 0.371], β = 0.576, 95% CI [0.378, 0.774]). The overall model did prove statistically significant, $F(1, 65) = 32.244$, $p < 0.001$.

Results show a positive correlation between math problem solving and brief math achievement ($r = 0.398$, $p = 0.001$). Math problem solving explains 15.8% of the variability in brief math achievement. A linear regression was used to determine if math problem solving could predict brief achievement. As math problem solving increased, brief math increased (*a* = 87.996, 95% CI [82.342, 93.650], *B* = 0.179, 95% CI [0.077, 0.282], β = 0.398, 95% CI [0.174, 0.621]). The overall model did prove statistically significant, $F(1,65) = 12.223$, $p = 0.001$.

Table 140
Correlations Between AIMSweb Winter Benchmarks with WJ-III Brief Math, Fourth Graders

AIMSweb Winter Benchmark	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.576	0.390	0.717	<0.001	0.332
Concepts and Applications	0.398	0.174	0.583	0.001	0.158

The results of a full model multiple regression are shown in Table 141. The full model R^2 was greater than zero and was statistically significant, $F(2 ,64) = 16.541$, $p < 0.001$, $R^2 = 0.341$. The two predictors accounted for 34.1% of the variance in brief math achievement. Math fluency (β = 0.512, $p < 0.001$) was the most influential predictor variable, followed by math problem solving (β = 0.115, p = 0.349). According to the structure coefficients, the most influential predictor was math fluency (r_s = 0.986), followed by math problem solving (r_s = 0.682).

Table 141
Predictors of Brief Math Achievement (AIMSweb), Fourth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.244	0.128	0.360	0.512	0.272	0.751	<0.001	0.986
Concepts and Applications	0.052	-0.058	0.161	0.115	-0.124	0.354	0.349	0.682

a (Constant)	95% Confidence Interval	
	Lower	Upper
82.335	76.620	88.050

Math Calculation Skills

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the AIMSweb Winter Benchmarks and the Math Calculation Skills cluster of the WJ-III are displayed in Table 142. Scatterplots for these correlations are displayed in Appendix Figures C18e and C18f. For participants in the Fourth Grade, results show a positive correlation between math fluency and math calculation skills (r = 0.741, p < 0.001). Math fluency explains 54.9% of the variability in math calculation skills. A linear regression was used to determine if math fluency could predict math calculation skills. As math fluency increased, math calculation skills increased (a = 83.188, 95% CI [78.863, 87.512], B = 0.357, 95% CI [0.277, 0.437], β =

0.741, 95% CI [0.578, 0.904]). The overall model did prove statistically significant, $F(1, 65) = 79.338$, $p < 0.001$.

Results show a positive correlation between math problem solving and math calculation skills ($r = 0.465$, $p < 0.001$). Math problem solving explains 21.6% of the variability in math calculation skills. A linear regression was used to determine if math problem solving could predict math calculation skills. As math problem solving increased, math calculation skills increased ($a = 90.208$, 95% CI [84.687, 95.729], $B = 0.212$, 95% CI [0.112, 0.312], $\beta = 0.465$, 95% CI [0.249, 0.681]). The overall model did prove statistically significant, $F(1, 65) = 17.910$, $p < 0.001$.

Table 142

Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Calculation Skills, Fourth Graders

AIMSweb Winter Benchmark	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.741	0.609	0.833	<0.001	0.549
Concepts and Applications	0.465	0.253	0.634	<0.001	0.216

The results of a full model multiple regression are shown in Table 143. The full model R^2 was greater than zero and was statistically significant, $F(2, 64) = 39.762$, $p < 0.001$, $R^2 = 0.554$. The two predictors accounted for 55.4% of the variance in math calculation skills. Math fluency ($\beta = 0.697$, $p < 0.001$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.080$, $p = 0.429$). According to the structure coefficients, the most influential predictor was math fluency (r_s = 0.996), followed by math problem solving (r_s = 0.624).

Table 143
Predictors of Math Calculation Skills (AIMSweb), Fourth Graders

AIMSweb Winter Benchmark	**b**	**95% Confidence Interval**		**β weights**	**95% Confidence Interval**		**p**	**r_s**
		Lower	**Upper**		**Lower**	**Upper**		
Computation	0.336	0.240	0.433	0.697	0.501	0.893	<0.001	0.996
Concepts and Applications	0.036	-0.055	0.128	0.080	-0.116	0.276	0.429	0.624

a (Constant)	**95% Confidence Interval**	
	Lower	**Upper**
82.411	77.655	87.167

Math Reasoning

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade on the AIMSweb Winter Benchmarks and the Math Reasoning cluster of the WJ-III are displayed in Table 144. Scatterplots for these correlations are displayed in Appendix Figures C18g and C18h. For participants in the Fourth Grade, results show a positive correlation between math fluency and math reasoning (r = 0.524, p < 0.001). Math fluency explains 27.5% of the variability in math reasoning. A linear regression was used to determine if math fluency could predict math reasoning. As math fluency increased, math reasoning increased (a = 86.464, 95% CI [81.283, 91.646], B = 0.238, 95% CI [0.142, 0.334], β = 0.524, 95% CI [0.316, 0.732]). The overall model did prove statistically significant, F(1, 65) = 24.562, p < 0.001.

Results show a positive correlation between math problem solving and math reasoning

($r = 0.466$, $p < 0.001$). Math problem solving explains 21.7% of the variability in math reasoning. A linear regression was used to determine if math problem solving could predict math reasoning. As math problem solving increased, math reasoning increased ($a = 88.177$, 95% CI [82.969, 93.385], $B = 0.200$, 95% CI [0.106, 0.295], $\beta = 0.466$, 95% CI [0.250, 0.682]). The overall model did prove statistically significant, $F(1, 65) = 17.989$, $p < 0.001$.

Table 144
Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Reasoning, Fourth Graders

AIMSweb Winter Benchmark	**Math Reasoning**	**95% Confidence Interval**		**p**	**r²**
		Lower	**Upper**		
Computation	0.524	0.325	0.679	<0.001	0.275
Concepts and Applications	0.466	0.254	0.635	<0.001	0.217

The results of a full model multiple regression are shown in Table 145. The full model R^2 was greater than zero and was statistically significant, $F(2, 64) = 14.991$, $p < 0.001$, $R^2 = 0.319$. The two predictors accounted for 31.9% of the variance in math reasoning. Math fluency ($\beta = 0.384$, $p = 0.003$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.254$, $p = 0.044$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.927$), followed by math problem solving ($r_s = 0.824$).

Table 145
Predictors of Math Reasoning (AIMSweb), Fourth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval Lower	95% Confidence Interval Upper	β weights	95% Confidence Interval Lower	95% Confidence Interval Upper	p	r_s
Computation	0.174	0.062	0.287	0.384	0.140	0.627	0.003	0.927
Concepts and Applications	0.109	0.003	0.216	0.254	0.010	0.497	0.044	0.824

a (Constant)	95% Confidence Interval Lower	95% Confidence Interval Upper
84.130	78.584	89.677

Fifth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence interval of the means obtained for the sample of participants in the Fifth Grade on the AIMSweb Computation Winter Benchmark, the AIMSweb Concepts and Applications Winter Benchmark, and the four clusters of the WJ-III are displayed in Table 146.

Table 146
Means for the AIMSweb Winter Benchmarks and the WJ-III Math Clusters, Fifth Graders (n=45)

AIMSweb Winter Benchmarks	Mean	Standard Deviation	95% Confidence Interval Lower	95% Confidence Interval Upper	WJ-III Cluster	Mean	Standard Deviation	95% Confidence Interval Lower	95% Confidence Interval Upper
Computation	50.78	19.559	45.064	56.495	Broad Math	101.20	12.050	97.679	104.720
Concepts and Applications	51.13	21.073	44.973	57.286	Brief Math	100.53	11.683	97.115	103.944
					Math Calculation Skills	100.20	11.690	96.783	103.616
					Math Reasoning	101.11	10.867	97.936	104.283

A correlation coefficient was calculated to determine the degree to which the mean scores on the Fifth Grade AIMSweb Computation Winter Benchmark correlate with the mean scores on the Fifth Grade AIMSweb Concepts and Applications Winter Benchmark. The correlation coefficient for the two Fifth Grade AIMSweb Winter Benchmarks is -0.454.

<u>Broad Math</u>

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the AIMSweb Winter Benchmarks and the Broad Math cluster of the WJ-III are displayed in Table 147. Scatterplots for these correlations are displayed in Appendix Figures C19a and C19b. For participants in the Fifth Grade, results show a positive correlation between math fluency as measured by the AIMSweb Computation Winter Benchmark and broad math achievement ($r = 0.430$, $p = 0.003$). Math fluency explains 18.5% of the variability in broad math achievement. A linear regression was used to determine if math fluency could predict broad math achievement. As math fluency increased, broad math achievement increased ($a = 87.742$, 95% CI [78.448, 97.036], $B = 0.265$, 95% CI [0.094, 0.436], $\beta = 0.430$, 95% CI [0.159, 0.700]). The overall model did prove statistically significant, $F(1, 43) = 9.764$, $p = 0.003$.

Results show a positive correlation between math problem solving as measured by the AIMSweb Concepts and Applications Winter Benchmark and broad math achievement ($r = 0.561$, $p < 0.001$). Math problem solving explains 31.5% of the variability in broad math achievement. A linear regression was used to determine if math problem solving could predict broad math achievement. As math problem solving increased, broad math achievement increased ($a = 84.810$, 95% CI [76.769, 92.852], $B = 0.321$, 95% CI [0.175, 0.466], $\beta = 0.561$, 95% CI [0.314, 0.808]). The overall model did prove statistically significant, $F(1, 43) = 19.699$, $p < 0.001$.

Table 147
Correlations Between AIMSweb Winter Benchmarks with WJ-III Broad Math, Fifth Graders

AIMSweb Winter Benchmark	**Broad Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.430	0.156	0.642	0.003	0.185
Concepts and Applications	0.561	0.320	0.734	<0.001	0.315

The results of a full model multiple regression are shown in Table 148. The full model R^2 was greater than zero and was statistically significant, $F(2, 42) = 11.460$, $p < 0.001$, $R^2 = 0.353$. The two predictors accounted for 35.3% of the variance in broad math achievement. Math problem solving ($\beta = 0.460$, $p = 0.002$) was the most influential predictor variable, followed by math fluency ($\beta = 0.221$, $p = 0.120$). According to the structure coefficients, the most influential predictor was math problem solving ($r_s = 0.943$), followed by math fluency ($r_s = 0.724$).

Table 148
Predictors of Broad Math (AIMSweb), Fifth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.136	-0.037	0.310	0.221	-0.051	0.493	0.120	0.724
Concepts and Applications	0.263	0.102	0.424	0.460	0.187	0.732	0.002	0.943

a (Constant)	95% Confidence Interval	
	Lower	Upper
80.826	71.436	90.215

Brief Math

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the AIMSWeb Winter Benchmarks and the Brief Math cluster of the WJ-III are displayed in Table 149. Scatterplots for these correlations are displayed in Appendix Figures C19c and C19d. For participants in the Fifth Grade, results show a positive correlation between math fluency and brief math achievement ($r = 0.395$, $p = 0.007$). Math fluency explains 15.6% of the variability in brief math achievement. A linear regression was used to determine if math fluency could predict brief math achievement. As math fluency increased, brief math increased ($a = 88.562$, 95% CI [79.391, 97.733], $B = 0.236$, 95% CI [0.067, 0.405], β = 0.395, 95% CI [0.120, 0.669]). The overall model did prove statistically significant, $F(1, 43) = 7.936$, $p = 0.007$.

Results show a positive correlation between math problem solving and brief math achievement ($r = 0.536$, $p < 0.001$). Math problem solving explains 28.7% of the variability in brief math achievement. A linear regression was used to determine if math problem solving could predict brief achievement. As math problem solving increased, brief math increased (a = 85.337, 95% CI [77.390, 93.284], B = 0.297, 95% CI [0.153, 0.441], β = 0.536, 95% CI [0.283, 0.789]). The overall model did prove statistically significant, $F(1, 43) = 17.340$, $p < 0.001$.

Table 149
Correlations Between AIMSweb Winter Benchmarks with WJ-III Brief Math, Fifth Graders

AIMSweb Winter Benchmark	**Brief Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.395	0.115	0.617	0.007	0.156
Concepts and Applications	0.536	0.288	0.717	<0.001	0.287

The results of a full model multiple regression are shown in Table 150. The full model R^2 was greater than zero and was statistically significant, $F(2, 42) = 9.711$, $p = 0.001$, $R^2 = 0.316$. The two predictors accounted for 31.6% of the variance in brief math achievement. Math problem solving (β = 0.450, $p = 0.003$) was the most influential predictor variable, followed by math fluency (β = 0.191, $p = 0.190$). According to the structure coefficients, the most influential predictor was math problem solving ($r_s = 0.953$), followed by math fluency ($r_s = 0.702$).

Table 150
Predictors of Brief Math Achievement (AIMSweb), Fifth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.114	-0.059	0.286	0.191	-0.089	0.471	0.190	0.702
Concepts and Applications	0.249	0.089	0.409	0.450	0.169	0.730	0.003	0.953

a (Constant)	95% Confidence Interval	
	Lower	Upper
82.010	72.651	91.368

Math Calculation Skills

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade on the AIMSweb Winter Benchmarks and the Math Calculation Skills cluster of the WJ-III are displayed in Table 151. Scatterplots for these correlations are displayed in Appendix Figures C19e and C19f. For participants in the Fifth Grade, results show a positive correlation between math fluency and math calculation skills ($r = 0.347$, $p = 0.019$). Math fluency explains 12.0% of the variability in math calculation skills. A linear regression was used to determine if math fluency could predict math calculation skills. As math fluency increased, math calculation skills increased ($a = 89.665$, 95% CI [80.298, 99.033], $B = 0.207$, 95% CI [0.035, 0.380], $\beta = 0.347$, 95% CI [0.066, 0.627]). The overall model did prove statistically significant, $F(1, 43) = 5.890$, $p = 0.019$.

Results show a positive correlation between math problem solving and math calculation skills ($r = 0.472$, $p = 0.001$). Math problem solving explains 22.3% of the variability in math calculation skills. A linear regression was used to determine if math problem solving could predict math calculation skills. As math problem solving increases, math calculation skills increased (*a* = 86.820, 95% CI [78.513, 95.127], *B* = 0.262, 95% CI [0.111, 0.412], β = 0.472, 95% CI [0.209, .735]). The overall model did prove statistically significant, $F(1, 43) = 12.305$, $p = 0.001$.

Table 151
Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Calculation Skills, Fifth Graders

AIMSweb Winter Benchmark	**Math Calculation Skills**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.347	0.060	0.581	0.019	0.120
Concepts and Applications	0.472	0.207	0.672	0.001	0.223

The results of a full model multiple regression are shown in Table 152. The full model R^2 was greater than zero and was statistically significant, $F(2, 42) = 6.805$, $p = 0.003$, $R^2 = 0.245$. The two predictors accounted for 24.5% of the variance in math calculation skills. Math problem solving (β = 0.396, $p = 0.012$) was the most influential predictor variable, followed by math fluency (β = 0.167, $p = 0.272$). According to the structure coefficients, the most influential predictor was math fluency ($r_s = 0.953$), followed by math problem solving ($r_s = 0.702$).

Table 152
Predictors of Math Calculation Skills (AIMSweb), Fifth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.100	-0.081	0.282	0.167	-0.129	0.463	0.272	0.702
Concepts and Applications	0.219	0.051	0.388	0.396	0.100	0.692	0.012	0.953

a (Constant)	95% Confidence Interval	
	Lower	Upper
83.895	74.052	93.737

Math Reasoning

Correlation coefficients, the lower and upper limits of the 95% confidence interval of the correlation coefficients, obtained p values, and obtained R^2 values for participants in the Fifth Grade on the AIMSweb Winter Benchmarks and the Math Reasoning cluster of the WJ-III are displayed in Table 153. Scatterplots for these correlations are displayed in Appendix Figures C19g and C19h. For participants in the Fifth Grade, results show a positive correlation between math fluency and math reasoning ($r = 0.488$, $p = 0.001$). Math fluency explains 23.8% of the variability in math reasoning. A linear regression was used to determine if math fluency could predict math reasoning. As math fluency increased, math reasoning increased ($a = 87.339$, 95% CI [79.235, 95.443], $B = 0.271$, 95% CI [0.122, 0.420], $\beta = 0.488$, 95% CI [0.227, 0.749]). The overall model did prove statistically significant, $F(1, 43) = 13.450$, $p = 0.001$.

Results show a positive correlation between math problem solving and math reasoning ($r = 0.602$, $p < 0.001$). Math problem solving explains 36.2% of the variability in math reasoning. A linear regression was used to determine if math problem solving could predict math reasoning. As math problem solving increases, math reasoning increased ($a = 85.238$, 95%

CI [78.245, 92.231], $B = 0.310$, 95% CI [0.184, 0.437], $\beta = 0.602$, 95% CI [0.362, 0.841]). The overall model did prove statistically significant, $F(1, 43) = 24.432$, $p < 0.001$.

Table 153
Correlations Between AIMSweb Winter Benchmarks with WJ-III Math Reasoning, Fifth Graders

AIMSweb Winter Benchmark	**Math Reasoning**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.488	0.227	0.684	0.001	0.238
Concepts and Applications	0.602	0.375	0.761	<0.001	0.362

The results of a full model multiple regression are shown in Table 154. The full model R^2 was greater than zero and was statistically significant, $F(2, 42) = 15.235$, $p < 0.001$, $R^2 = 0.420$. The two predictors accounted for 42.0% of the variance in math reasoning. Math problem solving ($\beta = 0.479$, $p = 0.001$) was the most influential predictor variable, followed by math fluency ($\beta = 0.271$, $p = 0.046$). According to the structure coefficients, the most influential predictor was math problem solving ($r_s = 0.928$), followed by math fluency ($r_s = 0.753$).

Table 154
Predictors of Math Reasoning (AIMSweb), Fifth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	0.150	0.003	0.298	0.271	0.012	0.529	0.046	0.753
Concepts and Applications	0.247	0.110	0.384	0.479	0.220	0.738	0.001	0.928

a (Constant)	95% Confidence Interval	
	Lower	Upper
80.844	72.829	88.858

Question Six

6.) **What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a criterion-referenced measure of math achievement, such as the math portion of the Texas Assessment of Knowledge and Skills?**

According to the hypothesis for Question 6, the researcher proposed that there would be a positive relationship between scores on the AIMSweb Math Computation Winter Benchmark and the Texas Assessment of Knowledge and Skills, or TAKS, Math Test. There would also be a positive relationship between scores on the AIMSweb Concepts and Applications Winter Benchmark and the TAKS Math Test. Based on these relationships, the researcher hypothesized that both AIMSweb Winter Benchmarks could be used to explain or predict math achievement as measured by the TAKS Math Test.

Question 6 was answered using the Pearson r, linear regression, and full model multiple regression. First, Pearson r coefficients were calculated using the scores for the AIMSweb Computation and AIMSweb Concepts and Applications Winter Benchmarks as predictor variables and the scores for the TAKS Math Test as the criterion variable. The coefficient of determinism, r squared or r^2, was calculated to determine how much variability within the TAKS Math Test was explained by each of the AIMSweb Winter Benchmarks. Then, linear regression was used to determine the degree to which scores from each of the AIMSweb Winter Benchmarks can be used to predict scores on the TAKS Math Test. Finally, a full model multiple regression was used to determine how using scores from both AIMSweb Winter Benchmarks explained or predicted scores on the TAKS Math Test. To correct for any experiment-wise Type I error, the alpha level used was 0.01 for the Pearson r coefficients and the linear regression. The alpha level used was 0.05 for the full model multiple regression.

Third Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the Third Grade on the AIMSweb Computation and AIMSweb Concepts and Applications Winter Benchmarks and the TAKS Math Test are displayed in Table 155.

Table 155

Means for the AIMSweb Winter Benchmarks and the TAKS Math Test, Third Graders (n=49)

AIMSweb Winter Benchmark	**Mean**	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Computation	52.06	19.379	46.634	57.485	TAKS Math	605.92	69.007	586.598	625.242
Concepts and Applications	49.76	20.036	44.150	55.369					

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Third

Grade are displayed in Table 156. Scatterplots for these correlations are displayed in Appendix Figures C20a and C20b. For participants in the Third Grade, results show a positive correlation between math fluency as measured by the AIMSweb Computation Winter Benchmark and performance on the TAKS Math Test (r = 0.490, p < 0.001). Math fluency explained 24.0% of the variability in the TAKS Math Test. A linear regression was used to determine if math fluency could predict performance on the TAKS Math Test. As math fluency increased, performance on the TAKS Math Test increased (a = 515.062, 95% CI [464.528, 565.595], B = 1.745 95% CI [0.834, 2.656], β = 0.490, 95% CI [0.241, 0.739]). The overall model did prove statistically significant, $F(1, 47) = 14.858$, p < 0.001.

Results show a positive correlation between math problem solving as measured by the AIMSweb Concepts and Applications Winter Benchmark and performance on the TAKS Math Test (r = 0.451, p = 0.001). Math problem solving explained 20.3% of the variability in the TAKS Math Test. A linear regression was used to determine if math problem solving could predict performance on the TAKS Math Test. As math problem solving increased, performance on the TAKS Math Test increased (a = 528.610, 95% CI [480.299, 576.920], B = 1.554, 95% CI [0.652, 2.456], β = 0.451, 95% CI [0.196, 0.706]). The overall model did prove statistically significant, $F(1, 47) = 12.010$, p = 0.001.

Table 156
Correlations Between AIMSweb Winter Benchmarks with the TAKS Math Test, Third Graders

AIMSweb Winter Benchmark	**TAKS Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.490	0.242	0.678	<0.001	0.240
Concepts and Applications	0.451	0.194	0.650	0.001	0.203

The results of a full model regression are shown in Table 157. The full model R^2 was greater than zero and was statistically significant, $F(2, 46) = 10.682$, $p < 0.001$, $R^2 = 0.317$. The two predictors accounted for 31.7% of the variance in performance on the TAKS Math Test. Math fluency ($\beta = 0.368$, $p = 0.008$) was the most influential predictor variable, followed by math problem solving ($\beta = 0.303$, $p = 0.028$). According to the structure coefficients, the most important predictor variable was math fluency ($r_s = 0.906$), followed by math problem solving ($r_s = 0.850$).

Table 157
Predictors of the TAKS Math Test, Third Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	1.311	0.357	2.265	0.368	0.107	0.629	0.008	0.906
Concepts and Applications	1.044	0.121	1.966	0.303	0.042	0.564	0.028	0.850

a (Constant)	95% Confidence Interval	
	Lower	Upper
485.739	430.786	540.691

Fourth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the Fourth Grade on the AIMSweb Computation and AIMSweb Concepts and Applications Winter Benchmarks and the TAKS Math Test are displayed in Table 158.

Table 158
Means for the AIMSweb Winter Benchmarks and the TAKS Math Test, Fourth Graders (n=64)

AIMSweb Winter Benchmark	**Mean**	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Computation	50.50	21.602	45.208	55.972	TAKS Math	673.75	76.675	654.965	692.535
Concepts and Applications	51.47	22.816	45.880	57.059					

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fourth Grade are displayed in Table 159. Scatterplots for these correlations are displayed in Appendix Figures C21a and C21b. For participants in the Fourth Grade, results show a positive correlation between math fluency as measured by the AIMSweb Computation Winter Benchmark and performance on the TAKS Math Test (r = 0.465, p < 0.001). Math fluency explained 21.6% of the variability in the TAKS Math Test. A linear regression was used to determine if math fluency could predict performance on the TAKS Math Test. As math fluency increased, performance on the TAKS Math Test increased (a = 590.373, 95% CI [546.614, 634.133], B = 1.651, 95% CI [0.853, 2.449], β = 0.465, 95% CI [0.245, 0.685]). The overall model did prove statistically significant, F(1, 62) = 17.120, p < 0.001.

Results show a positive correlation between math problem solving as measured by the AIMSweb Concepts and Applications Winter Benchmark and performance on the TAKS Math Test (r = 0.394, p = 0.001). Math problem solving explained 15.5% of the variability in the TAKS Math Test. A linear regression was used to determine if math problem solving could predict performance on the TAKS Math Test. As math problem solving increased, performance on the TAKS Math test increased (a = 605.582, 95% CI [561.495, 649.669], B = 1.324, 95% CI

[0.540, 2.109], β = 0.394, 95% CI [0.164, 0.623]). The overall model did prove statistically significant, $F(1, 62) = 11.401$, $p = 0.001$.

Table 159
Correlations Between AIMSweb Winter Benchmarks with the TAKS Math Test, Fourth Graders

AIMSweb Winter Benchmark	TAKS Math	95% Confidence Interval		p	r^2
		Lower	Upper		
Computation	0.465	0.247	0.638	<0.001	0.216
Concepts and Applications	0.394	0.164	0.583	0.001	0.155

The results of a full model regression are shown in Table 160. The full model R^2 was greater than zero and was statistically significant, $F(2, 61) = 10.026$, $p < 0.001$, $R^2 = 0.247$. The two predictors accounted for 24.7% of the variance in performance on the TAKS Math Test. Math fluency (β = 0.357, $p = 0.008$) was the most influential predictor variable, followed by math problem solving (β = 0.207, $p = 0.118$). According to the structure coefficients, the most important predictor variable was math fluency ($r_s = 0.939$), followed by math problem solving ($r_s = 0.805$).

Table 160
Predictors of the TAKS Math Test, Fourth Graders

AIMSweb Winter Benchmark	b	95% Confidence Interval		β weights	95% Confidence Interval		p	r_s
		Lower	Upper		Lower	Upper		
Computation	1.265	0.339	2.192	0.357	0.100	0.614	0.008	0.939
Concepts and Applications	0.695	-0.182	1.572	0.207	-0.049	0.464	0.118	0.805

a (Constant)	95% Confidence Interval	
	Lower	Upper
574.053	526.158	621.949

Fifth Grade

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the Fifth Grade on the AIMSweb Computation and AIMSweb Concepts and Applications Winter Benchmarks and the TAKS Math Test are displayed in Table 161.

Table 161
Means for the AIMSweb Winter Benchmarks and the TAKS Math Test, Fifth Graders (n=44)

AIMSweb Winter Benchmark	Mean	Standard Deviation	95% Confidence Interval			Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Computation	51.50	19.168	45.837	57.162	TAKS Math	696.50	100.529	666.796	726.204
Concepts and Applications	51.86	20.733	45.733	57.987					

Correlation coefficients, the lower and upper limits for the 95% confidence interval of the correlation coefficients, obtained p values, and obtained r^2 values for participants in the Fifth Grade are displayed in Table 162. Scatterplots for these correlations are displayed in Appendix

Figures C22a and C22b. For participants in the Fifth Grade, results show a positive correlation between math fluency as measured by the AIMSweb Computation Winter Benchmark and performance on the TAKS Math Test ($r = 0.505$, $p < 0.001$). Math fluency explained 25.5% of the variability in the TAKS Math Test. A linear regression was used to determine if math fluency could predict performance on the TAKS Math Test. As math fluency increased, performance on the TAKS Math Test increased ($a = 560.095$, 95% CI [482.744, 637.446], $B = 2.649$, 95% CI [1.239, 4.058], $\beta = 0.505$, 95% CI [0.244, 0.766]). The overall model did prove statistically significant, $F(1, 42) = 14.380$, $p < 0.001$.

Results show a positive correlation between math problem solving as measured by the AIMSweb Concepts and Applications Winter Benchmark and performance on the TAKS Math Test ($r = 0.641$, $p < 0.001$). Math problem solving explained 41.1% of the variability in the TAKS Math Test. A linear regression was used to determine if math problem solving could predict performance on the TAKS Math Test. As math problem solving increased, performance on the TAKS Math Test increased ($a = 535.245$, 95% CI [470.632, 599.858], $B = 3.109$, 95% CI [1.951, 4.268], $\beta = 0.641$, 95% CI [0.409, 0.872]). The overall model did prove statistically significant, $F(1, 42) = 29.328$, $p < 0.001$.

Table 162
Correlations Between AIMSweb Winter Benchmarks with the TAKS Math Test, Fifth Graders

AIMSweb Winter Benchmark	**TAKS Math**	**95% Confidence Interval**		**p**	**r^2**
		Lower	**Upper**		
Computation	0.505	0.245	0.697	<0.001	0.255
Concepts and Applications	0.641	0.425	0.788	<0.001	0.411

The results of a full model regression are shown in Table 163. The full model R^2 was greater than zero and was statistically significant, $F(2, 41) = 18.803$, $p < 0.001$, $R^2 = 0.478$. The two predictors accounted for 47.8% of the variance in performance on the TAKS Math Test. Math problem solving ($\beta = 0.521$, $p < 0.001$) was the most influential predictor variable, followed by math fluency ($\beta = 0.286$, $p = 0.027$). According to the structure coefficients, the most important predictor variable was math problem solving ($r_s = 0.931$), followed by math fluency ($r_s = 0.748$).

Table 163
Predictors of the TAKS Math Test, Fifth Graders

AIMSweb Winter Benchmark	**b**	**95% Confidence Interval**		**β weights**	**95% Confidence Interval**		**p**	**r_s**
		Lower	**Upper**		**Lower**	**Upper**		
Computation	1.499	0.182	2.816	0.286	0.042	0.529	0.027	0.748
Concepts and Applications	2.526	1.309	3.744	0.521	0.277	0.764	<0.001	0.931

a (Constant)	**95% Confidence Interval**	
	Lower	**Upper**
488.288	414.156	562.419

Question Seven

7.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI across the three grade levels?

According to the hypothesis for Question 7, the researcher proposed that there would be a systematic difference in the level of school motivation and learning and study strategies across the three grade levels. Specifically, the researcher predicted that fifth graders would demonstrate higher levels than third and fourth graders on those scales measuring academic strengths and on those scales measuring academic liabilities. Question 7 was answered using a one-way ANOVA. The three grade levels served as the grouping variable and the mean of the raw scores obtained for each grade level on the scales of the SMALSI were the intervally-scaled variables being compared. Levene's test of homogeneity of variance was used to determine if the variance within each grade level was relatively equal. Eta squared, or η^2, values were computed to determine the ratio of variance that is explained by grade level. To correct for any experiment-wise Type I error, the alpha level used was 0.01.

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Study Strategies scale of the SMALSI are displayed in Table 164. The results of Levene's test for homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 170) = 0.207$, $p = 0.814$. The analysis of variance did not reveal a statistically significant difference, $F(2, 170) = 1.013$, $p = 0.365$, $\eta^2 = 0.012$ (see Table 165 for the ANOVA Summary Table).

Table 164
Means for SMALSI Study Strategies Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=59)	20.03	7.656	18.093	21.966
Fourth Grade (n=67)	20.71	7.151	19.010	22.409
Fifth Grade (n=47)	18.73	7.001	16.750	20.709

Table 165
ANOVA Summary Table, SMALSI Study Strategies by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	105.213	2	52.607	1.013	0.365	0.012
Within	8827.989	170	51.929			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Note Taking/Listening Skills scale of the SMALSI are displayed in Table 166. The results of Levene's test for homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 173) = 0.663$, $p = 0.517$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 173) = 0.552$, $p = 0.577$, $\eta^2 = 0.006$ (see Table 167 for the ANOVA Summary Table).

Table 166
Means for SMALSI Note Taking/Listening Skills Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=60)	28.43	9.296	26.078	30.782
Fourth Grade (n=68)	28.50	9.026	26.353	30.646
Fifth Grade (n=48)	26.90	7.993	24.638	29.162

Table 167
ANOVA Summary Table, SMALSI Note Taking/Listening Skills by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	86.509	2	43.255	0.552	0.577	0.006
Within	13560.212	173	78.383			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Reading/ Comprehension Strategies scale of the SMALSI are displayed in Table 168. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 171) = 0.139$, $p = 0.870$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F\ (2, 171) = 0.632$, $p = 0.533$, $\eta^2 = 0.007$ (see Table 169 for the ANOVA Summary Table).

Table 168
Means for SMALSI Reading/Comprehension Strategies Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=59)	21.75	8.247	19.662	23.837
Fourth Grade (n=68)	22.31	9.457	20.069	24.550
Fifth Grade (n=47)	20.29	7.904	18.053	22.526

Table 169
ANOVA Summary Table, SMALSI Reading/Comprehension Strategies by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	93.483	2	46.742	0.632	0.533	0.007
Within	12646.149	171	73.954			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Writing/Research Skills scale of the SMALSI are displayed in Table 170. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 170) = 2.170$, $p = 0.164$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 170) = 4.302$, $p = 0.015$, $\eta^2 = 0.048$ (see Table 171 for the ANOVA Summary Table)

Table 170
Means for SMALSI Writing/Research Skills Scale by Grade Level

Grade	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**
Third Grade (n=59)	17.57	6.074	16.033	19.107
Fourth Grade (n=67)	20.54	6.562	18.979	22.100
Fifth Grade (n=47)	18.38	5.051	16.951	19.809

Table 171
ANOVA Summary Table, SMALSI Writing/Research Skills by Grade Level

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Between	301.710	2	150.855	4.302	0.015	0.048
Within	5961.203	170	35.066			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Test-Taking

Strategies scale of the SMALSI are displayed in Table 172. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 171) = 0.128$, $p = 0.880$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 171) = 1.421$, $p = 0.244$, $\eta^2 = 0.016$ (see Table 173 for the ANOVA Summary Table).

Table 172
Means for SMALSI Test-Taking Strategies Scale by Grade Level

Grade	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**
Third Grade (n=59)	22.88	6.999	21.108	24.652
Fourth Grade (n=67)	23.10	7.136	21.405	24.795
Fifth Grade (n=48)	21.27	6.731	19.364	23.175

Table 173
ANOVA Summary Table, SMALSI Test-Taking Strategies by Grade Level

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Between	133.548	2	66.774	1.421	0.244	0.016
Within	8034.067	171	46.983			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Time Management/Organizational Techniques scale of the SMALSI are displayed in Table 174. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 169) = 2.020$, $p = 0.136$. The analysis of variance did reveal a statistically significant difference between the three grade levels, $F(2, 169) = 5.831$, $p = 0.004$, $\eta^2 = 0.065$ (see Table 175 for the ANOVA Summary Table).

Table 174
Means for the SMALSI Time Management/Organizational Techniques Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=58)	22.47	7.708	20.519	24.420
Fourth Grade (n=66)	26.38	9.360	24.155	28.605
Fifth Grade (n=48)	22.42	6.804	20.495	24.345

Table 175
ANOVA Summary Table, SMALSI Time Management/Organizational Techniques by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	728.201	2	364.101	5.831	0.004	0.065
Within	10552.845	169	62.443			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the mean raw scores obtained for participants in the three grade levels on the Low Academic Motivation scale of the SMALSI are displayed in Table 176. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 167) = 2.163$, $p = 0.118$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 167) = 0.020$, $p = 0.980$, $\eta^2 < 0.001$ (see Table 177 for the ANOVA Summary Table).

Table 176
Means for SMALSI Low Academic Motivation Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=59)	14.45	10.035	11.911	16.988
Fourth Grade (n=66)	14.49	11.413	11.777	17.203
Fifth Grade (n=45)	14.58	9.708	11.834	17.326

Table 177
ANOVA Summary Table, SMALSI Low Academic Motivation by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	4.554	2	2.277	0.020	0.980	<0.001
Within	18905.540	167	113.207			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for participants in the three grade levels on the Test Anxiety scale of the SMALSI are displayed in Table 178. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is relatively equal, $F(2, 169) = 1.869$, $p = 0.147$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 169) = 1.735$, $p = 0.180$, $\eta^2 = 0.020$ (see Table 179 for the ANOVA Summary Table).

Table 178
Means for SMALSI Test Anxiety Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=59)	22.73	10.694	20.023	25.437
Fourth Grade (n=67)	20.97	12.660	17.961	23.979
Fifth Grade (n=46)	24.79	13.271	21.034	28.545

Table 179
ANOVA Summary Table, Test Anxiety by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	511.245	2	255.622	1.735	0.180	0.020
Within	24905.918	169	147.372			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the mean raw scores obtained for participants in the three grade levels on the Concentration/Attention Difficulties scale of the SMALSI are displayed in Table 180. The results of Levene's test of homogeneity of variance reveal that the variance within the three grade levels is not relatively equal, $F(2, 164) = 10.864$, $p < 0.001$. The analysis of variance did not reveal a statistically significant difference between the three grade levels, $F(2, 164) = 1.889$, $p = 0.155$, $\eta^2 = 0.023$ (see Table 181 for the ANOVA Summary Table).

Table 180
Means for the SMALSI Concentration/Attention Difficulties Scale by Grade Level

Grade	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Third Grade (n=54)	14.93	8.955	12.664	17.196
Fourth Grade (n=66)	18.53	14.490	15.086	21.974
Fifth Grade (n=47)	19.79	10.810	16.732	22.848

Table 181
ANOVA Summary Table, SMALSI Concentration/Attention Difficulties by Grade Level

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	547.004	2	273.502	1.889	0.155	0.023
Within	23749.834	164	144.816			

Question Eight

8.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI based on gender?

According to the hypothesis for Question 8, the researcher proposed that there would be a systematic difference in the level of school motivation and learning and study strategies based on gender. Specifically, the researcher predicted that females would demonstrate higher levels than males on those scales measuring academic strengths and on the test anxiety scale. The researcher predicted that males would demonstrate higher levels than females on the low academic motivation and concentration and attention difficulties scales. Question 8 was answered using a one-way ANOVA. Gender served as the grouping variable and the mean of the raw scores obtained for each gender on the scales of the SMALSI were the intervally-scaled variables being compared. Levene's test of homogeneity of variance was used to determine if the variance within each gender was relatively equal. Eta squared, or η^2, values were computed to determine the ratio of variance that is explained by gender. To correct for any experiment-wise Type I error, the alpha level used was 0.01.

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Study Strategies scale of the SMALSI are displayed in Table 182. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 171) = 0.002$, $p = 0.961$. The analysis of variance did reveal a statistically significant difference, $F(1, 171) = 9.130$, $p = 0.003$, $\eta^2 = 0.051$ (see Table 183 for the ANOVA Summary Table).

Table 182
Means for SMALSI Study Strategies Scale by Gender

Gender	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**
Female (n=87)	21.45	7.376	19.917	22.983
Male (n=86)	18.39	6.904	16.939	19.840

Table 183
ANOVA Summary Table, SMALSI Study Strategies by Gender

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Between	452.783	1	452.783	9.130	0.003	0.051
Within	8480.420	171	49.593			

The means, standard deviation, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Note Taking/Listening

Skills scale of the SMALSI are displayed in Table 184. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 174) = 1.089$, $p = 0.298$. The analysis of variance did reveal a statistically significant difference, $F(1, 174) = 8.959$, $p = 0.003$, $\eta^2 = 0.049$ (see Table 185 for the ANOVA Summary Table).

Table 184
Means for SMALSI Note Taking/Listening Skills Scale by Gender

Gender	**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**
Female (n=89)	29.97	8.351	28.235	31.705
Male (n=87)	26.07	8.919	24.196	27.943

Table 185
ANOVA Summary Table, SMALSI Note Taking/Listening Skills by Gender

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Between	668.237	1	668.237	8.959	0.003	0.049
Within	12978.485	174	74.589			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Reading/Comprehension Strategies scale of the SMALSI are displayed in Table 186. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 172) = 3.556$, $p = 0.061$. The analysis of variance did reveal a statistically significant difference, $F(1, 172) = 12.480$, $p = 0.001$, $\eta^2 = 0.068$ (see Table 187 for the ANOVA Summary Table).

Table 186
Means for SMALSI Reading/Comprehension Strategies Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=89)	23.89	9.521	21.912	25.868
Male (n=85)	19.20	6.916	17.747	20.652

Table 187
ANOVA Summary Table, SMALSI Reading/Comprehension Strategies by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	861.862	1	861.862	12.480	0.001	0.068
Within	11877.771	172	69.057			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Writing/ Research Skills scale of the SMALSI are displayed in Table 188. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 171) = 2.826$, $p = 0.095$. The analysis of variance did not reveal a statistically significant difference, $F(1, 171) = 6.603$, $p = 0.011$, $\eta^2 = 0.037$ (see Table 189 for the ANOVA Summary Table).

Table 188
Means for SMALSI Writing/Research Skills Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=88)	20.12	6.389	18.793	21.447
Male (n=85)	17.72	5.623	16.538	18.902

Table 189

ANOVA Summary Table, SMALSI Writing/Research Skills by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	232.827	1	232.837	6.603	0.011	0.037
Within	6030.076	171	35.264			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Test-Taking Strategies scale of the SMALSI are displayed in Table 190. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 172) = 0.310$, $p = 0.578$. The analysis of variance did reveal a statistically significant difference, $F(1, 172) = 9.036$, $p = 0.003$, $\eta^2 = 0.050$ (see Table 191 for the ANOVA Summary Table).

Table 190

Means for SMALSI Test-Taking Strategies Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=89)	24.18	6.569	22.815	25.544
Male (n=85)	20.84	7.030	19.362	22.318

Table 191

ANOVA Summary Table, SMALSI Test-Taking Strategies by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	407.668	1	407.668	9.036	0.003	0.050
Within	7759.947	172	45.116			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Time Management/ Organizational Techniques scale of the SMALSI are displayed in Table 192. The results of

Levene's test of homogeneity of variance reveal that the variance within each gender is equal, $F(1, 170) = 6.812$, $p = 0.010$. The analysis of variance did reveal a statistically significant difference, $F(1, 170) = 10.558$, $p = 0.001$, $\eta^2 = 0.058$ (see Table 193 for the ANOVA Summary Table).

Table 192
Means for SMALSI Time Management/Organizational Techniques Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=88)	26.03	9.043	24.150	27.909
Male (n=84)	21.85	7.014	20.376	23.324

Table 193
ANOVA Summary Table, SMALSI Time Management/Organizational Techniques by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	659.640	1	659.640	10.558	0.001	0.058
Within	10621.407	170	62.479			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Low Academic Motivation scale of the SMALSI are displayed in Table 194. The results of Levene's test of homogeneity of variance reveal that the variance within between each gender is relatively equal, $F(1, 168) = 0.090$, $p = 0.765$. The analysis of variance did not reveal a statistically significant difference, $F(1,168) = 0.026$, $p = 0.873$, $\eta^2 < 0.001$ (see Table 195 for the ANOVA Summary Table).

Table 194
Means for SMALSI Low Academic Motivation Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=88)	14.51	10.519	12.324	16.695
Male (n=82)	14.49	10.433	12.297	16.683

Table 195
ANOVA Summary Table, SMALSI Low Academic Motivation by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	2.891	1	2.891	0.026	0.873	<0.001
Within	18907.201	168	112.543			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Test Anxiety scale of the SMALSI are displayed in Table 196. The results of Levene's test reveal that the variance within each gender is relatively equal, $F(1, 170) = 0.629$, $p = 0.429$. The analysis of variance did not reveal a statistically significant difference, $F(1, 170) = 3.626$, $p = 0.059$, $\eta^2 = 0.021$ (see Table 197 for the ANOVA Summary Table).

Table 196
Means for SMALSI Test Anxiety Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=85)	24.31	12.422	21.728	26.891
Male (n=87)	20.87	11.850	18.380	23.359

Table 197

ANOVA Summary Table, SMALSI Test Anxiety by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	530.818	1	530.818	3.626	0.059	0.021
Within	24886.345	170	146.390			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants on the Concentration/Attention Difficulties scale of the SMALSI are displayed in Table 198. The results of Levene's test of homogeneity of variance reveal that the variance within each gender is relatively equal, $F(1, 165) = 0.452$, $p = 0.502$. The analysis of variance did not reveal a statistically significant difference, $F(1,165) = 1.559$, $p = 0.214$, $\eta^2 = 0.009$ (see Table 199 for the ANOVA Summary Table).

Table 198

Means for SMALSI Concentration/Attention Difficulties Scale by Gender

Gender	Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper
Female (n=84)	16.40	11.557	13.999	18.801
Male (n=83)	18.92	12.283	16.338	21.501

Table 199

ANOVA Summary Table, SMALSI Concentration/Attention Difficulties by Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Between	227.437	1	227.437	1.559	0.214	0.009
Within	24069.401	165	145.875			

Question Nine

9.) Is there an interaction effect on level of school motivation and learning and study strategies being reported by students on the SMALSI based on grade level and gender?

According to the hypothesis for Question 9, the researcher proposed that there would be an interaction effect on school motivation and learning and study strategies based on grade level and gender. The researcher predicted that females would demonstrate higher levels than males on those scales measuring academic strengths, males would demonstrate higher levels than females on those scales measuring academic liabilities, and that fifth graders would demonstrate higher levels of academic strengths and liabilities than third and fourth graders. If an interaction effect exists, then fifth grade females would report having the highest levels of school motivation and learning and study strategies, next would be fifth grade males, followed by fourth grade females, after that would be fourth grade males, subsequently would be third grade females, and third grade males would report the lowest levels of school motivation and learning and study strategies. Question 9 was answered using a two factor ANOVA. Gender and grade level served as the grouping variables and the mean of the raw scores obtained on the scales of the SMALSI for the males and females of each grade level were the intervally-scaled variables being compared. Levene's test of homogeneity of variance was used to determine if the variance within each group was relatively equal. Eta squared, or η^2, values were computed to determine the ratio of variance that is explained by the interaction between grade level and gender. To correct for any experiment-wise Type I error, the alpha level used was 0.01.

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth

Grades on the SMALSI Study Strategies scale are displayed in Table 200. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 167) = 0.453$, $p = 0.811$. The two-factor analysis of variance showed a statistically significant main effect for gender, $F(1, 167) = 10.158$, $p = 0.002$, $\eta^2 = 0.057$. It did not show a statistically significant main effect for grade level, $F(2, 167) = 1.568$, $p = 0.212$, $\eta^2 = 0.018$; or a statistically significant interaction between grade level and gender, $F(2, 167) = 0.603$, $p = 0.549$, $\eta^2 = 0.007$ (see Table 201 for the ANOVA Summary Table).

Table 200

Means for SMALSI Study Strategies Scale by Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=30)	21.80	7.141	19.244	24.356	**Third Grade (n=29)**	18.27	7.861	15.457	21.083
Fourth Grade (n=30)	23.03	7.648	20.336	25.723	**Fourth Grade (n=37)**	18.76	6.153	16.778	20.742
Fifth Grade (n=27)	19.32	7.061	16.705	21.935	**Fifth Grade (n=20)**	17.90	7.011	14.826	20.973

Table 201
ANOVA Summary Table, SMALSI Study Strategies By Grade Level and Gender

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Grade	155.196	2	77.598	F(2,167)=1.568	0.212	0.018
Gender	502.766	1	502.766	F(1,167)=10.158	0.002	0.057
Grade x Gender	59.648	2	29.826	F(2,167)=0.603	0.549	0.007
Within	8265.474	167	49.494			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Note Taking and Listening Skills scale are displayed in Table 202. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 170) = 1.058$, $p = 0.385$. The two-factor analysis of variance showed a statistically significant main effect for gender, $F(1, 170) = 9.583$, $p = 0.002$, $\eta^2 = 0.053$. It did not show a statistically significant main effect for grade level, $F(2, 170) = 0.936$, $p = 0.394$, $\eta^2 = 0.011$; or a statistically significant interaction between grade level and gender, $F(2, 170) = 0.062$, $p = 0.940$, $\eta^2 = 0.001$ (see Table 203 for the ANOVA Summary Table).

Table 202

Means for SMALSI Note Taking/Listening Skills Scale by Grade Level and Gender

	Females					Males			
	Mean	Standard Deviation	95% Confidence Interval			Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Third Grade (n=30)	30.53	7.951	27.684	33.376	**Third Grade (n=30)**	26.33	10.172	22.690	29.969
Fourth Grade (n=31)	30.94	9.416	27.625	34.254	**Fourth Grade (n=37)**	26.46	8.268	23.796	29.124
Fifth Grade (n=28)	28.29	7.517	25.504	31.075	**Fifth Grade (n=20)**	24.95	8.420	21.259	28.641

Table 203

ANOVA Summary Table, SMALSI Note Taking/Listening Skills By Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	141.304	2	70.652	F(2,170)=0.936	0.394	0.011
Gender	723.031	1	723.031	F(1,170)=9.583	0.002	0.053
Grade x Gender	9.323	2	4.662	F(2,170)=0.062	0.940	0.001
Within	12827.858	170	74.858			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Reading/Comprehension Strategies scale are displayed in Table 204. The results of Levene’s test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 168) = 1.706$, $p = 0.136$. The two-factor analysis of variance showed a statistically significant main effect for gender, $F(1, 168) = 13.492$, $p < 0.001$, $\eta^2 = 0.074$. It did not show a statistically significant main effect for grade level, $F(2, 168) = 1.213$, $p = 0.300$, $\eta^2 = 0.014$; or a statistically significant interaction between grade level and gender, $F(2, 168) = 0.316$, $p = 0.730$, $\eta^2 = 0.004$ (see Table 205 for the ANOVA Summary Table).

Table 204

Means for SMALSI Reading/Comprehension Strategies Scale by Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=30)	24.77	7.890	21.945	27.594	**Third Grade (n=29)**	18.73	7.570	15.261	21.039
Fourth Grade (n=31)	24.94	11.869	20.761	29.119	**Fourth Grade (n=37)**	20.11	6.177	18.120	22.099
Fifth Grade (n=28)	21.79	8.085	18.795	24.785	**Fifth Grade (n=19)**	18.20	7.331	14.987	21.412

Table 205
ANOVA Summary Table, SMALSI Reading/Comprehension Strategies by Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	168.445	2	84.222	F(2,168)=1.213	0.300	0.014
Gender	936.423	1	936.823	F(1,168)=13.492	<0.001	0.074
Grade x Gender	43.839	2	21.919	F(2,168)=0.316	0.730	0.004
Within	11665.487	168	69.437			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Writing/Research Skills scale are displayed in Table 206. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 167) = 2.098$, $p = 0.068$. The two-factor analysis of variance showed a statistically significant main effect for grade level, $F(2, 167) = 4.932$, $p = 0.008$, $\eta^2 = 0.056$; and a statistically significant main effect for gender, $F(1, 167) = 7.838$, $p = 0.006$, $\eta^2 = 0.045$. It did not show a statistically significant interaction between grade level and gender, $F(2, 167) = 0.231$, $p = 0.794$, $\eta^2 = 0.003$ (see Table 207 for the ANOVA Summary Table).

Table 206

Means for SMALSI Writing/Research Skills Scale by Grade Level and Gender

	Females					Males			
	Mean	Standard Deviation	95% Confidence Interval			Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Third Grade (n=30)	18.53	5.941	16.403	20.657	**Third Grade (n=29)**	16.60	6.151	14.398	18.801
Fourth Grade (n=31)	22.23	7.338	19.646	24.813	**Fourth Grade (n=36)**	19.14	5.549	17.352	20.928
Fifth Grade (n=27)	19.50	5.196	17.575	21.425	**Fifth Grade (n=20)**	16.80	4.503	14.826	18.774

Table 207

ANOVA Summary Table, SMALSI Writing/Research Skills By Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	335.424	2	167.712	F(2,167)=4.932	0.008	0.056
Gender	266.551	1	266.551	F(1,167)=7.838	0.006	0.045
Grade x Gender	15.701	2	7.851	F(2,167)=0.231	0.794	0.003
Within	5678.951	167	34.006			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Test-Taking Strategies scale are displayed in Table 208. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 168) = 0.232$ $p = 0.948$. The two-factor analysis of variance showed a statistically significant main effect for gender, $F(1, 168) = 10.143$, $p = 0.002$, $\eta^2 = 0.057$. It did not show a statistically significant main effect for grade level, $F(2, 168) = 2.023$, $p = 0.135$, $\eta^2 = 0.024$; or a statistically significant interaction between grade level and gender, $F(2, 168) = 0.282$, $p = 0.755$, $\eta^2 = 0.003$ (see Table 209 for the ANOVA Summary Table).

Table 208

Means for the SMALSI Test-Taking Strategies Scale By Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=30)	25.23	6.224	23.003	27.457	**Third Grade (n=29)**	20.53	7.036	18.011	23.049
Fourth Grade (n=31)	24.84	6.832	22.435	27.245	**Fourth Grade (n=36)**	21.65	7.150	19.347	23.953
Fifth Grade (n=28)	22.32	6.470	19.922	24.717	**Fifth Grade (n=20)**	19.80	6.978	16.742	22.858

Table 209

ANOVA Summary Table, SMALSI Test-Taking Strategies By Grade Level and Gender

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Grade	181.879	2	90.940	F(2,168)=2.023	0.135	0.024
Gender	455.999	1	455.999	F(1,168)=10.143	0.002	0.057
Grade x Gender	25.338	2	12.669	F(2,168)=0.282	0.755	0.003
Within	7552.729	168	44.957			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Time Management/Organizational Techniques scale are displayed in Table 210. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 166) = 1.839$, $p = 0.108$. The two-factor analysis of variance showed a statistically significant main effect for grade level, $F(2, 166) = 7.613$, $p = 0.001$, $\eta^2 = 0.084$; and a statistically significant main effect for gender , $F(1, 166) = 14.032$, $p < 0.001$, $\eta^2 = 0.078$. It did not show a statistically significant interaction between grade level and gender, $F(2, 166) = 1.826$, $p = 0.164$, $\eta^2 = 0.022$ (see Table 211 for the ANOVA Summary Table).

Table 210
Means for SMALSI Time Management/Organizational Techniques Scale by Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=30)	24.87	8.102	21.971	27.769	**Third Grade (n=28)**	20.07	6.581	17.716	22.424
Fourth Grade (n=30)	29.94	10.234	26.337	33.542	**Fourth Grade (n=36)**	23.41	7.470	21.003	25.817
Fifth Grade (n=28)	22.96	7.136	20.315	25.604	**Fifth Grade (n=20)**	21.65	6.409	18.841	24.459

Table 211
ANOVA Summary Table, SMALSI Time Management/Organizational Techniques By Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	874.736	2	437.368	F(2,166)=7.613	0.001	0.084
Gender	806.175	1	806.175	F(1,166)=14.032	<0.001	0.078
Grade x Gender	209.655	2	104.828	F(2,166)=1.825	0.164	0.022
Within	9537.015	166	57.452			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Low Academic Motivation scale are displayed in Table 212. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 164) = 1.044$, $p = 0.108$. The two-factor analysis of variance did not show a statistically significant main effect for grade level, $F(2, 164) = 0.023$, $p = 0.997$, $\eta^2 < 0.001$. It did not show a statistically significant main effect for gender, $F(1, 164) = 0.031$, $p = 0.860$, $\eta^2 < 0.001$. It did not show a statistically significant interaction between grade level and gender, $F(2, 164) = 0.642$, $p = 0.528$, $\eta^2 = 0.008$ (see Table 213 for the ANOVA Summary Table).

Table 212
Means for SMALSI Low Academic Motivation Scale By Grade Level and Gender

	Females					Males			
	Mean	Standard Deviation	95% Confidence Interval			Mean	Standard Deviation	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Third Grade (n=30)	14.57	10.650	10.759	18.380	**Third Grade (n=29)**	14.33	9.560	10.909	17.750
Fourth Grade (n=31)	15.39	11.586	11.311	19.469	**Fourth Grade (n=35)**	13.73	11.369	10.066	17.393
Fifth Grade (n=27)	13.46	9.359	9.992	16.927	**Fifth Grade (n=18)**	16.15	10.210	11.675	20.625

Table 213
ANOVA Summary Table, SMALSI Low Academic Motivation By Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	5.245	2	2.623	F(2,164)=0.023	0.977	<0.001
Gender	3.585	1	3.585	F(1,164)=0.031	0.860	<0.001
Grade x Gender	146.752	2	73.376	F(2,164)=0.642	0.528	0.008
Within	18755.204	164	114.361			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Test Anxiety scale are displayed in Table 214. The results of Levene's test of homogeneity of variance reveal that the variance is relatively equal within the six groups, $F(5, 166) = 2.050$, $p = 0.074$. The two-factor analysis of variance did not show a statistically significant main effect for grade level, $F(2, 166) = 1.480$, $p = 0.231$, $\eta^2 = 0.017$. It did not show a statistically significant main effect for gender, $F(1, 166) = 3.095$, $p = 0.080$, $\eta^2 = 0.018$. It did not show a statistically significant interaction between grade level and gender, $F(2, 166) = 0.686$, $p = 0.505$, $\eta^2 = 0.009$ (see Table 215 for the ANOVA Summary Table).

Table 214
Means for SMALSI Test Anxiety Scale By Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=30)	24.97	12.221	20.597	29.343	**Third Grade (n=29)**	20.50	8.545	17.442	23.558
Fourth Grade (n=31)	23.81	13.029	19.223	28.396	**Fourth Grade (n=36)**	18.59	12.003	14.722	22.457
Fifth Grade (n=26)	24.18	12.374	19.597	28.762	**Fifth Grade (n=20)**	25.65	14.723	19.197	32.102

Table 215
ANOVA Summary Table, SMALSI Test Anxiety By Grade Level and Gender

Source	**Sum of Squares**	**Degrees of Freedom**	**Mean Square**	**F**	**p**	**η^2**
Grade	432.546	2	216.273	F(2,166)=1.480	.231	.017
Gender	452.119	1	452.119	F(1,166)=3.095	.080	.018
Grade x Gender	220.564	2	100.282	F(2,166)=.686	.505	.009
Within	24253.235	166	146.104			

The means, standard deviations, and the lower and upper limits for the 95% confidence intervals of the means obtained for male and female participants in the Third, Fourth, and Fifth Grades on the SMALSI Concentration/Attention Difficulties scale are displayed in Table 216. The results of Levene's test of homogeneity of variance reveal that the variance is not relatively equal within the six groups, $F(5, 161) = 4.668$, $p = 0.001$. The two-factor analysis of variance did not show a statistically significant main effect for grade level, $F(2, 161) = 2.026$, $p = 0.135$, $\eta^2 = 0.025$. It did not show a statistically significant main effect for gender, $F(1, 161) = 1.831$, $p = 0.178$, $\eta^2 = 0.011$. It did not show a statistically significant interaction between grade level and gender, $F(2, 161) = 0.971$, $p = 0.381$, $\eta^2 = 0.012$ (see Table 217 for the ANOVA Summary Table).

Table 216

Means for SMALSI Concentration/Attention Difficulties Scale By Grade Level and Gender

	Females					**Males**			
	Mean	**Standard Deviation**	**95% Confidence Interval**			**Mean**	**Standard Deviation**	**95% Confidence Interval**	
			Lower	**Upper**				**Lower**	**Upper**
Third Grade (n=26)	13.43	8.245	10.480	16.379	**Third Grade (n=28)**	16.43	9.515	13.025	19.835
Fourth Grade (n=30)	18.65	14.843	13.424	23.875	**Fourth Grade (n=36)**	18.43	14.392	13.792	23.067
Fifth Grade (n=27)	17.11	10.071	13.380	20.839	**Fifth Grade (n=20)**	23.55	10.928	18.759	28.340

Table 217
ANOVA Summary Table, SMALSI Concentration/Attention Difficulties By Grade Level and Gender

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p	η^2
Grade	583.898	2	291.949	F(2,161)=2.026	0.135	0.025
Gender	264.330	1	264.330	F(1,161)=1.831	0.178	0.011
Grade x Gender	279.811	2	139.906	F(2,161)=0.971	0.381	0.012
Within	23205.692	161	144.135			

CHAPTER V

DISCUSSION, SUMMARY, AND CONCLUSIONS

The present study evaluated the SMALSI to determine its potential utility in being used for universal screening and progress monitoring in an RTI model for addressing academic difficulties in mathematics. This was done by examining the relationship between performance on the scales of the SMALSI and performance on the WJ-III, a commonly used measure of math achievement. This relationship was examined for the full sample and the three grade levels used in this study. In addition, the present study examined the relationship between scores on the AIMSweb Math Winter Benchmarks and scores on two different types of measures of math achievement. This was done to determine the predictive utility of the AIMSweb Math Winter Benchmarks for identifying students at-risk of underachievement in mathematics or of failing the Texas statewide assessment in mathematics, the Texas Assessment of Knowledge and Skills, or TAKS test. Finally, performance on the SMALSI was further explored by examining systematic differences in the use of study and learning strategies reported by students based on gender and grade level.

The study was guided by nine research questions. The first three questions were related and examined the degree to which the nine scales of the SMALSI explained or predicted scores on the four math clusters of the WJ-III when they were used individually as predictors. The first question examined the four scales from the SMALSI that measure study and learning strategies, strategies that are used for acquiring and remembering newly presented information. The second question examined the two scales from the SMALSI that measure strategies in reading and writing, skills that are necessary for academic success across subject areas. The third question examined the three scales from the SMALSI that measure academic liabilities, factors that are known to hinder or limit one's chances for academic success. The fourth question examined the degree to which performance on the four math clusters of the WJ-III could be explained or predicted by all nine scales of the SMALSI.

The fifth and sixth questions were related and examined the degree to which the AIMSweb Math Computation and AIMSweb Concepts and Applications Winter Benchmarks explained or predicted performance on two types of measures of math achievement. The first measure was the WJ-III, a norm-referenced measure of math achievement, and the second measure was the Texas Assessment of Knowledge and Skills test in mathematics, a criterion-referenced measure of math achievement. Finally, the seventh, eighth, and ninth questions were related and examined performance on the SMALSI to determine if there was a systematic difference based on gender, grade level, and the interaction between these grouping variables. The next section is a discussion of the findings organized by research question.

1.) What is the relationship between scores on the Study Strategies, Note Taking/ Listening Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI and the math cluster scores of the WJ-III?

According to the hypothesis for Question 1, it was proposed that there would be a positive relationship between study strategies, note taking and listening skills, test-taking strategies, and time management and organizational techniques and the four math achievement clusters of the WJ-III. For the full sample, none of the four scales on the SMALSI were found to be statistically significant predictors for the four math clusters of the WJ-III. Test taking strategies approached statistical significance as a predictor for broad math achievement (see Table 41). Note taking and listening skills, test taking strategies, and time management and organizational skills approached statistical significance as predictors for math calculation skills (see Table 43). Test taking strategies approached statistical significance as a predictor for math reasoning (see Table 44). While none of the four scales of the SMALSI were found to have or approach statistical significance as predictors for Third and Fourth Graders, all four scales of the SMALSI achieved or approximated statistical significance as predictors for students in the Fifth Grade (see Tables 56 through 59). Study strategies were a statistically significant predictor for all four math clusters. Time management and organizational techniques were statistically significant predictors for math calculation skills, and test taking strategies were a statistically significant predictor for math reasoning.

The results for Question 1 were consistent with previous findings on learning and study strategies, which showed a strong relationship between learning and study strategies and math achievement, especially as students move up in the curriculum (Perels, et al., 2009). Study strategies demonstrated potential as a predictor of math achievement for the full sample, and it was found to be a statistically significant predictor for math achievement for students in the Fifth Grade. Study strategies enhance problem-solving skills, which are necessary for completing a variety of math-related tasks (Henley, et al., 2006; Kenny & Faunce, 2004; Scheiter, et al., 2010). For the full sample, note taking and listening skills, test taking strategies, and time management and organizational techniques demonstrated potential as predictors for math calculation skills, but when looking at students by grade level, only time management and organizational techniques were statistically significant, and only for students in the Fifth Grade. Note taking and listening skills had been shown to enhance scores on measures of general math achievement (DeZure, et al., 2001), but this was the first time they showed potential as a predictor for basic math calculation skills. Previous literature has shown an indirect relationship between organizational techniques (Shimabukuro, et al., 1999), and a similar relationship most likely explains how time management and organizational techniques predicted math calculation skills for the students in this study. Students who report more organizational skills are considered more likely to solve problems requiring math calculations in a methodical manner and to complete all of the steps required for solving math problems by hand. The need to engage in a methodical approach becomes more important as students move into higher grade levels, where the problems they are expected to solve become increasingly complex (Cobb, et al., 1990; DesJardins, et al., 2010). A similar finding occurred for test taking strategies, which was a statistically significant predictor for math reasoning skills for students in the Fifth Grade. Just like organizational skills, test-taking strategies become more important as students advance in school and the need to be able to use learned algorithms to solve problems on standardized tests becomes critical as it increases the likelihood that students will be able to arrive at a correct response (Jitendra, et al., 2009; Lesh & Zawojewski, 2007; Rojas, 2010).

2.) What is the relationship between scores on the Reading/Comprehension Strategies and Writing/Research Skills scales and the math cluster scores of the WJ-III?

According to the hypothesis for Question 2, it was proposed that there would be a positive relationship between reading and comprehension strategies and writing and research skills and the four math achievement clusters of the WJ-III. For the full sample, writing and research skills on the SMALSI approached statistical significance as a predictor for the four math clusters of the WJ-III (see Tables 61 through 64). For students in the Third Grade, reading comprehension strategies approached statistical significance as a predictor for math reasoning (see Table 69). This relationship was surprising for two reasons. First, the word problems from the math reasoning subtests were read aloud to participants by the examiner. Second, the correlation between reading comprehension strategies and math reasoning was found to be negative. Previous research has shown a strong positive correlation between measures of reading and math achievement and has suggested that students who are poor readers perform worse on math tasks (Cantrell, et al., 2010; Lee, 2010; Vukovic, et al., 2010). Since participants were shown the word problem and given the opportunity to read it themselves, it is possible that the strategies that facilitate comprehension of word problems read aloud interfere with strategies students use when reading and comprehending word problems they read to themselves (Ghanizedah, 2009). This interference would be similar to that which is found in dichotic listening tasks, where an individual is required to listen to different material in their left and right ears (Hugdahl & Andersson, 1984, 1986; Speaks, Niccum, Carney, & Johnson, 1981). Many people, particularly those who have problems with reading, find these tasks difficult, especially when required to shift their attention from the message transmitted into one ear to the message being transmitted to the other ear (Asbjornsen & Bryden, 1998; Asbjornsen, Helland, Obrzut, & Boliek, 2003). Recent research has also found that students in elementary school experience this same kind of interference when expected to read something to themselves at the same time that a spoken message is presented to them (Arciuli, Rankine, & Monaghan, 2010). The circumstances were different in this study in that the content read to the student by the examiner was the same as the content available for the student to read to him/her self, but it is possible that the same type of interference was involved. It is also possible that reading comprehension skills are not as developed for students in Third Grade, the first school year in which students are expected to engage in reading to learn (Chall, 1983; Simmons & Kame'enui, 1998), and therefore do not play a critical role on math reasoning tasks. Writing and research strategies approached statistical significance as a predictor for math achievement and math reasoning for students in

Fourth Grade (see Tables 71 and 74), and was statistically significant as a predictor for students in Fifth Grade (see Tables 76 through 79). Prior research on writing and research strategies suggests that the relationship between math and writing skills is indirect (Coker & Lewis, 2008; Graham & Perin, 2007). Effective writers engage in planning and organizational strategies, and these strategies also lead to accurate responses when completing math calculations or solving math word problems.

3.) What is the relationship between scores on the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales and the math cluster scores of the WJ-III?

According to the hypothesis for Question 3, it was proposed that there would be a negative relationship between the low academic motivation, test anxiety, and concentration and attention difficulties scales of the SMALSI and the four math achievement clusters of the WJ-III. Consistent with the hypothesis for Question 3, all of the obtained correlation coefficients were negative. For the full sample, all three SMALSI scales approached or achieved statistical significance as predictors for all four math clusters on the WJ-III (see Tables 81 through 84). For students in Third Grade, low academic motivation as well as concentration and attention difficulties approached statistical significance as predictors but test anxiety was not a statistically significant predictor (see Tables 86 through 89). The fact that test anxiety was not found to be statistically significant for Third Grade could be explained by findings that anxiety in children tends to remain low and relatively stable during the early elementary school years and tends to increase in upper elementary school as teacher and parental demands increase (Creswell, Shildrick, & Field, 2011). For students in Fourth Grade, all three SMALSI scales approached or achieved statistical significance for broad math, brief math, and math reasoning, but only test anxiety approached statistical significance for math calculation skills (see Tables 91 through 94). Although the test anxiety scale of the SMALSI is a measure of general test anxiety, the negative correlation between test anxiety and math calculation skills is consistent with previous research in which students who reported high levels of math anxiety also performed worse on measures of calculation ability (Krinzinger, et al., 2009). For Fifth Grade, low academic motivation approached statistical significance for broad math and brief math and achieved statistical significance as a predictor for math reasoning (see Tables 96, 97, and 99). The negative impact of low academic motivation is consistent with previous literature on the effects of motivation, where students with higher levels of motivation were found to demonstrate more engagement in mathematics and science (Berger & Karabenick, 2011). Levels of attention and concentration have previously been shown to play a role in reducing math fact and procedural errors and increasing solution accuracy (Raghubar, et al., 2009), so the negative relationship found for the full sample between attention and concentration and performance on all four measures of the WJ-III is consistent with this finding. This relationship was strongest for math reasoning, where students must identify and attend to important details in order to develop an appropriate solution.

4.) Can school motivation and learning and study strategies as measured by scores on the nine scales of the SMALSI Child Form be used to predict math achievement as measured by the math cluster scores of the WJ-III?

According to the hypothesis for Question 4, it was proposed that there would be a positive relationship between the Study Strategies, Note Taking/Listening Skills, Reading/Comprehension Strategies, Writing/Research Skills, Test-Taking Strategies, and Time Management/Organizational Techniques scales of the SMALSI Child Form and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III. In addition, there would be negative relationship between the Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties scales of the SMALSI Child Form and the Broad Math, Brief Math, Math Calculation Skills, and Math Reasoning clusters of the WJ-III. Based on these relationships, the researcher hypothesized that school motivation and learning and study strategies as measured on the nine scales of the SMALSI could be used to predict math achievement as measured on the four math clusters of the WJ-III.

When the scales of the SMALSI were used individually as predictors of the WJ-III for the full sample, low academic motivation explained the most variance for all the math clusters except for math reasoning, which was better explained by test anxiety. When all nine scales were used together, reading comprehension strategies was the most significant predictor. The structure coefficient for low academic motivation was statistically significant for all four math clusters, which is consistent with its importance as a single predictor (see Tables 103 through 106). For students in Third Grade, concentration and attention difficulties explained the most variance for all the math clusters except math reasoning as a single predictor, which was better explained by low academic motivation. When all nine scales were used together, the full regression model approached statistical significance for broad math and was statistically significant for math reasoning (see Tables 110 and 113). Similarly to the full sample, reading and comprehension strategies were the most significant predictor. For broad math, the structure coefficient for concentration and attention difficulties was statistically significant, while low academic motivation was statistically significant for math reasoning. This is consistent with their importance as individual predictors.

For students in Fourth Grade, the full model regression was statistically significant for broad math, brief math, and math reasoning (see Tables 117, 118, and 120). Test anxiety explained most of the variance in these clusters as a single predictor, and the structure coefficient for test anxiety showed that it continued to be a significant predictor in the full model regression. Writing and research skills was the most significant predictor when all nine scales were used as predictors. For students in Fifth Grade, study strategies explained most of the variance for broad math, brief math, and math calculation skills and low academic motivation explained most of the variance for math reasoning when the scales were used individually as predictors. When all nine scales were used as predictors, study strategies and low academic motivation continued to be significant based on their structure coefficients, but reading and comprehension strategies was the most significant predictor (see Tables 124 through 127). This was consistent with the results from the full sample and for students in the Third Grade.

There has been a debate for some time about the degree to which language is involved while completing math tasks. Some research has suggested that the impact of language is minimal or its impact is indirect (Cirino, 2011; Geary, 2004; Spelke & Tsivkin, 2001) while other studies have shown that language is necessary for the learning of math concepts and completion of math tasks (Carey, 2004; Desoete, et al., 2003; Gelman & Butterworth, 2005). The results obtained for Question 4 support the position that language and verbal processing do play a role in math skill development as they were useful predictors of math achievement for students who participated in this study. The fact that writing and research skills were found to be a more significant predictor for fourth graders than reading and comprehension strategies is most likely explained by the greater emphasis placed on writing in the fourth grade language arts curriculum, as fourth grade is the school year that students take a state mandated test in writing. Study skills, academic motivation, attention and concentration also proved to be useful predictors.

5.) **What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a norm-referenced measure of math achievement, such as the WJ-III?**

According to the hypothesis for Question 5, it was proposed that there would be a positive relationship between scores on the AIMSweb Math Computation and AIMSweb Concepts and Applications Winter Benchmarks and the four math clusters of the WJ-III. Based on these relationships, the researcher hypothesized that both of the AIMSWeb Winter Benchmarks could be used to explain or predict math achievement as measured on the four math clusters of the WJ-III.

For students in Third Grade, the AIMSweb Math Computation Winter Benchmark explained more of the variance in Broad Math, Brief Math, and Math Calculation Skills and the AIMSweb Concepts and Applications Winter Benchmark explained more of the variance in Math Reasoning (see Tables 129 through 136). The AIMSweb Math Computation Winter Benchmark explained more of the variance in all four clusters for students in Fourth Grade (see Tables 138 through 145), while for students in Fifth Grade, the AIMSweb Concepts and Applications Winter Benchmark explained more of the variance in the four math clusters (see Tables 147 through 154). The results for students in Third and Fourth Grade are consistent with previous research on math curriculum-based measures of computation skills, which has found them to be an easy and inexpensive way of screening students to identify those at risk of academic problems in the area of math achievement (Shapiro, et al., 2006). There has been little research on math curriculum-based measures of concepts and applications, and because the AIMSweb Concepts and Applications system was not made available until the 2009-2010 school year, no research has been conducted on the system used in this study. The fact that the AIMSweb Concepts and Applications Winter Benchmark explained more of the variability in Math Reasoning for students in Third Grade makes sense. Both the AIMSweb Concepts and Applications Winter Benchmark and the Math Reasoning cluster of the WJ-III require that students solve word problems and are both designed to measure the ability to apply mathematical principles when solving word problems.

It is interesting to note that the Concepts and Applications Winter Benchmarks did not explain more of the variability in Math Reasoning for students in Fourth Grade. This could be explained by something unique about the Fourth Grade Winter Benchmarks or something unique about the sample of students used in this study. When the AIMSweb Winter Benchmarks are compared, the amount of variance explained for students in Third Grade was greater than the amount explained for students in Fourth Grade. When comparing the reliability of the measures used in this study for students in Third and Fourth Grade, the reliability coefficients on the subtests of the WJ-III and the AIMSweb Winter Benchmarks are lower for students in Fourth Grade than students in Third Grade. The only exception is the Math Fluency subtest on the WJ-III. For this subtest, students in Fourth Grade obtained the highest reliability coefficient of all three grade levels. The fact that the same version of the WJ-III was administered to all students in this study suggests that this difference may be due to something unique to the sample of students in the Fourth Grade rather than something unique to the AIMSweb Fourth Grade Winter Benchmarks. It is also possible that this difference could be due to some external factor, such as more emphasis being placed on mastery of basic math facts in Fourth Grade than in Third Grade.

For students in Fifth Grade, the AIMSweb Concepts and Applications Winter Benchmark explained more variability in all four math clusters, consistent with what has been reported by other researchers. As students progress through the math curriculum, more emphasis is placed on math problem solving and math reasoning (Spelke & Tsivkin, 2001), so only looking at math computation may not be enough when screening students for low math achievement (Fuchs, et al., 1994).

6.) **What is the relationship between scores on the AIMSweb Math Computation and AIMSweb Math Concepts and Applications Winter Benchmarks and scores obtained on a criterion-referenced measure of math achievement, such as the math portion of the Texas Assessment of Knowledge and Skills?**

According to the hypothesis for Question 6, it was proposed that there would be a positive relationship between scores on the AIMSweb Math Computation and Concepts and Applications Winter Benchmarks and the Texas Assessment of Knowledge and Skills, or TAKS, Math Test. Based on these relationships, the researcher hypothesized that both AIMSweb Winter Benchmarks could be used to explain or predict math achievement as measured by the TAKS Math Test. For all three grade levels, the AIMSweb Winter Benchmarks proved to be statistically significant predictors of performance on the TAKS Math Test (see Tables 156, 157, 159, 160, 162, and 163). Consistent with the results for Question 5, the AIMSweb Computation Winter Benckmarks explained more of the variability for students in Third and Fourth Grade and the AIMSweb Concepts and Applications Winter Benchmarks explained more of the variability for students in Fifth Grade. When both Winter Benchmarks were used as predictors Computation was a more significant predictor for students in Third and Fourth Grade and Concepts and Applications was a more significant predictor for students in Fifth Grade.

An interesting difference between the results for Questions 5 and 6 is that the AIMSweb Winter Benchmarks were able to explain more variability in performance for students in the Third Grade than for students in the Fourth and Fifth Grade on the WJ-III math clusters but explained more of the variability among students in Fifth Grade on the TAKS Math Test than they did for the other two grade levels. The reliability coefficients for each grade level on the TAKS Math Test indicate that there was greater internal consistency among students in the Fifth Grade than for the other two grade levels. This difference in internal consistency could explain the difference in how useful the AIMSweb Winter Benchmarks proved to be as predictors of performance on the TAKS Math Test.

The fact that the AIMSweb Computation Winter Benchmarks were useful predictors for the TAKS Math Test is consistent with research that has found curriculum-based fluency measures to be useful predictors of student performance on other statewide achievement tests (Hintze & Silberglitt, 2005; Keller & Shapiro, 2005; Roehrig, et al., 2008; Vander Meer, et al., 2005). There is no prior research investigating the use of the AIMSweb Concepts and Applications Winter Benchmarks to predict performance on statewide achievement test measures, primarily because this system was not made available for widespread use until the 2009-2010 school year, but research has suggested that math fluency measures are not sufficient for predicting math achievement (Fuchs, et al., 1994) and the use of curriculum-based measures that require students to apply mathematical concepts and use mathematical reasoning are more predictive of math achievement than those that measure computation alone (Foegen, 2008b).

7.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI across the three grade levels?

According to the hypothesis for Question 7, it was proposed that there would be a systematic difference in the level of school motivation and learning and study strategies across the three grade levels. Specifically, the researcher predicted that fifth graders would demonstrate higher levels than third and fourth graders on those scales measuring academic strengths and on those scales measuring academic liabilities. This hypothesis was developed based on previous literature that found that students in elementary school develop more advanced learning and study strategies as they progress through the curriculum (De Corte, et al., 2000; Waeytens, et al., 2002) and this is often enhanced by the fact that teachers spend more time providing explicit instruction on learning, study, and self-regulatory strategies in the upper elementary grades than in the lower elementary grades (Hamman, Berthelot, Saia, & Crowley, 2000; Moely, Santulli, & Obach, 1995). For most of the scales of the SMALSI, there were no statistically significant differences between the three grade levels, a finding that is consistent with the results of similar analyses conducted on the standardization sample (Stroud & Reynolds, 2006). Of the two scales that did show statistically significant differences, the findings were unexpected and inconsistent with the hypothesis for Question 7. For writing and research skills, a statistically significant difference was found, with fourth graders showing better developed writing and research skills, followed by fifth graders, then third graders (see Tables 170 and 171). The fact that writing and research skills were found to be better developed for students in Fourth Grade than in Fifth Grade may be explained by the greater emphasis placed on writing in the fourth grade language arts curriculum, as fourth grade is the school year that students take a state mandated test in writing. For time management and organizational techniques, a statistically significant difference was found with fourth graders showing better developed skills than third and fifth graders, respectively (see Tables 174 and 175). This difference is not consistent with any prior research on time management skills or organizational skills and may be due to something unique to the sample of students used in this study.

8.) Are there systematic differences in the level of school motivation and learning and study strategies being reported by students on the SMALSI based on gender?

According to the hypothesis for Question 8, it was proposed that there would be a systematic difference in the level of school motivation and learning and study strategies based on gender. Specifically, the researcher predicted that females would demonstrate higher levels than males on those scales measuring academic strengths and on the test anxiety scale. The researcher predicted that males would demonstrate higher levels than females on low academic motivation and concentration and attention difficulties scales. Previous research on gender differences has shown that females tend to exhibit more learning, study, and self-regulatory strategies than males when completing academic and non-academic tasks (Charles & Luoh, 2003; Jacob, 2002). Males tend to score lower on measures of academic motivation (Preckel, et al., 2008) and higher on measures of concentration and attention difficulties (Biederman, et al., 2002). Females tend to report more anxiety during test-taking situations than males (Ho, et al., 2000). Results for this study were statistically significant for study strategies, note taking and listening skills, reading and comprehension strategies, test taking strategies, and time management and organizational techniques scales and approached statistical significance for the writing and research skills and test anxiety scales (see Tables 182 through 193 and Tables 196 and 197). Consistent with previous research, females tended to report using more learning and study strategies. In addition, females in this study reported experiencing more anxiety during test-taking situations.

9.) Is there an interaction effect on level of school motivation and learning and study strategies being reported by students on the SMALSI based on grade level and gender?

According to the hypothesis for Question 9, it was proposed that there would be an interaction effect on school motivation and learning and study strategies based on grade level and gender. The researcher predicted that females would demonstrate higher levels than males on those scales measuring academic strengths and test anxiety, and males would demonstrate higher levels than females on the low academic motivation and attention and concentration difficulties scales. In addition, the researcher predicted that fifth graders would demonstrate higher levels of academic strengths and liabilities than third and fourth graders. If an interaction effect exists, then fifth grade females would report having the highest levels of school motivation and learning and study strategies, next would be fifth grade males, followed by fourth grade females, after that would be fourth grade males, subsequently would be third grade females, and third grade males would report the lowest levels of school motivation and learning and study strategies. The results of this study did not show an interaction effect based on grade level and gender. Most prior research has looked at gender differences, and there is little research that has looked at differences across grade levels. Based on the results of this study and previous research, it would appear that the differences are much more pronounced between males and females than they are across different grade levels.

In summary, the findings of the research questions offer a glimpse of how learning and study strategies impact math achievement. Learning and study strategies enhance performance in mathematics, but the results of this study did not show their effect to be as strong as the researcher had expected. When examined individually, some scales of the SMALSI were shown to explain math achievement. Some of the scales had a greater impact on performance in mathematics than others, but it was when all nine scales were used that they demonstrated the most influence. The use of study skills and learning strategies appear to have a greater effect as students move up in grade level, even though the amount of study skills and learning strategies students reported did not substantially differ across grade levels. The largely non-significant results do not add any useful information to the literature on learning and study strategies, but the study does make a modest contribution by looking at the relationship between learning and strategy use and math achievement.

The AIMSweb Math Winter Benchmarks proved to correlate highly with the WJ-III, suggesting that school personnel can feel confident using the Benchmarks to identify students requiring more intensive instruction or intervention in mathematics. They also correlate highly with the TAKS Math Test, suggesting that school personnel could use the results of the AIMSweb Winter Benchmarks, administered in January, for identifying students who are at-risk of not meeting the minimum passing standard on the TAKS Math Test, administered in April. Previous research had looked at the correlation between measures of math fluency, like the AIMSweb Computation Winter Benchmark, and performance on measures of math achievement, but the correlation between performance on measures of math reasoning, such as the AIMSweb Concepts and Applications Winter Benchmark, had not been investigated extensively in the literature. This study was able to show that math reasoning skills have a greater impact on math achievement as students move up in grade level and that using both Winter Benchmarks is more useful at predicting performance on formal measures of math achievement than Math Computation alone. Finally, previous research had examined differences in strategy use based on age and gender, but no previous study had examined these differences using one measure, such as the SMALSI to measure strategy use, and no study had examined the interaction between age and gender.

Limitations

Several issues and common pitfalls have been identified that can create problems in educational research. Experimental research with random sampling and random assignment is considered the 'gold standard' because it yields the strongest conclusions. Based on the findings of experimental research, conclusions about causality can be made because one of the major assumptions of random sampling and random assignment is that the effect of extraneous variables has been removed or made probabilistically equivalent (Chen & Green, 2010). In reality, experimental research is often not possible in educational research because it requires that the experimenter be able to manipulate variables that are often beyond his or her control, such as class schedules and assigned teachers, as well as personal variables, such as gender, grade level, or socioeconomic status (Buyse, 2000; Todd et al., 2004). For this reason, most educational research is quasi-experimental, using participants from already existing groups or groups that are naturally occurring (Hill & Shih, 2009; Song & Herman, 2010). In both experimental and quasi-experimental research, it can be difficult to have groups that are balanced, equal in terms of number of participants as well as participant characteristics (Hill & Shih, 2009; Todd, et al., 2004).

In addition, educational research is generally correlational in nature, which has a number of limitations. The correlation between scores on measures of two constructs can be influenced by unreliability in measurement of the variables, which is why it is important for researchers to report the reliability of the scores obtained from the sample of the study (Thompson, 2003). Range restriction and artificial dichotomization of continuous variables also can impact the correlation between two variables causing *r* to be either attenuated and closer to zero or, in some circumstances, increase the value of *r* (Hunter & Schmidt, 2001; Thompson, 2006). Another artifact of a study that can impact the size and direction of observed correlations occurs when individual members of the sample respond randomly to items. This is particularly a problem on psychological inventories (Crede, 2010). The current study had some of these limitations.

a) *Reliability*. In general, coefficients of 0.6 or higher indicate acceptable level of reliability, and most of the scales used in this study met that standard for the full sample and the three grade levels. For students in the Fourth Grade, the reliability coefficients were generally lower than the coefficients for other grade levels. Two of the reliability coefficients, the coefficients for the subtests making up the Math Reasoning cluster of the WJ-III, fell below 0.6. For this reason, the low reliability coefficients for some of the measures, particularly for students in the Fourth Grade, may have attenuated the *r* coefficients calculated between two constructs.

b) *Restriction of Range.* The scatterplots for the correlations between the WJ-III and the SMALSI indicate that restriction of range was an issue and may have attenuated the value of the *r* coefficient. There is a much wider range of scores for the full sample than the three grade levels. The scatterplots suggest that students in Fifth Grade had the widest range, followed by students in Third Grade, and students in Fourth Grade had the narrowest range of scores. This could explain why the results for students in Fifth Grade were more statistically significant than the results obtained for the other two grade levels.

c) *Artificial dichotomization of continuous variables.* The reliability coefficients and the group averages for the Inconsistent Responding Index suggest that students who participated in this sample were consistent in how they answered on the SMALSI. When individual student responses were analyzed, there were some students who tended to respond with “Never” or “Always” and rarely used the middle ratings of “Sometimes” or “Often.” This was particularly true of students in the Third Grade. While the individual items are measured on an ordinal scale, this tendency could have produced some artificial dichotomization in student responses and could attenuate or inflate the value of the T score for the scales of the SMALSI, which could then attenuate or inflate the *r* coefficient obtained, both for the full sample and for the student’s assigned grade level.

d) *Random responding.* While the overall reliability coefficients and the group averages for the Inconsistent Responding Index suggest that students who participated in this sample were consistent in how they answered on the SMALSI, there were a few individuals in the sample who obtained a high score on the Inconsistent Responding Index. This was particularly true for students in the Third Grade. Random responding on the SMALSI could have impacted the size and the direction of the *r* coefficient.

e) *Unbalanced groups.* The researcher attempted to obtain an equal number of participants in terms of both gender and grade level. This was accomplished for gender but was not accomplished for grade level. It is possible to examine systematic differences among unbalanced groups, but it is not as powerful as a research design in which the groups are balanced, making it less likely to find statistically significant differences between the groups.

f) *Unmatched groups.* In addition to having an equal number of participants in each assigned group, it is also desirable to match the groups based on personal characteristics that may impact obtained differences between groups. Some personal characteristics that are relevant to educational research include socioeconomic status, language proficiency, disability status, and placement in special education. Participants within the groups were not matched based on these personal characteristics and this could have impacted the results of this study and how these results might generalize to those obtained in similar studies. There were more students with an identified disability in Third Grade and Fifth Grade than in Fourth Grade and more students receiving special education services in Fifth Grade than the other two grade levels. There were more students identified as English Language Learners in Fourth Grade than the other two grade levels. There were also differences in the number of students receiving intervention services, as well as the areas for which students were referred for services, between the three grade levels. There were more students in Third Grade receiving intervention services for reading, more students in Fourth Grade receiving intervention services for English language proficiency and behavior concerns, and more students in Fifth Grade receiving intervention services for mathematics. Of the students with an identified disability, the majority of the students in Third Grade were identified as having a speech and language impairment and receiving speech therapy services. The majority of the students in Fifth Grade were identified as having a specific language disability in reading. Most of these students had received instruction at one time in a special education setting but were receiving all of their instruction in the general education setting at the time the present study was conducted.

Conclusions

Five conclusions are presented based upon the results. First, learning and study strategies impact academic achievement in mathematics. In particular, reading and comprehension strategies, writing and research skills, test taking strategies, study strategies, time management and organizational techniques, and note taking and listening skills all have a strong positive relationship with general math achievement, as well as math calculation skills and math reasoning. Interestingly, performance on measures of math achievement was explained more by reading and comprehension strategies and writing and research skills than by test taking strategies. This finding is consistent with previous research showing that achievement in reading is highly predictive of achievement in math. This finding provides further support for previous research by showing that the use of different learning and study strategies enhances math achievement. It also contributes something new to the literature on learning and study strategies because it used a measure like the SMALSI, which measures multiple strategies, rather than a measure like those used in previous studies, which assessed just one type of strategy.

Second, the type of strategies associated with higher math achievement change as students advance in grade level. In Third and Fourth Grade, reading and comprehension strategies, as well as writing and research skills, were shown to have a more significant role than in Fifth Grade. In Fifth Grade, reading and comprehension strategies and writing and research skills continue to be associated with math achievement, but study skills and test taking strategies become increasingly important. As the demands placed on students become more complex and as the math curriculum places more emphasis on reasoning and problem solving, it would make sense that students would need to apply more advanced strategies while completing math-related tasks.

Third, the impact of learning and study strategies becomes more pronounced as students advance in grade level. The use of learning and study strategies has a greater impact on math achievement for students in Fifth Grade than for students in Third and Fourth Grade. This makes sense as previous longitudinal research has identified Sixth Grade as a critical year for students having acquired appropriate learning and study skills, as those without adequate skills tend to experience difficulty and low achievement in mathematics throughout middle and high school (Perels, et al., 2009). It also suggests that Third and Fourth Grade may be a critical time for students to receive explicit instruction in learning and study strategies. Screening for deficits in learning and study strategies could start as early as the Third Grade but would have the most benefit once students enter Fifth Grade.

Fourth, low academic motivation and difficulties with attention and concentration have a negative impact on math achievement. In addition, test anxiety has a negative impact on math achievement, but the impact changes across grade levels. Initially, it has a greater impact on tasks requiring math calculation but as students get older its impact is greater on tasks requiring math reasoning. This may be due to the fact that students demonstrate greater mastery of basic math facts as they advance in grade level, so they experience less anxiety when confronted with math calculation tasks, but as the demands in the area of math reasoning tasks become more complex, the anxiety they experience when solving math reasoning tasks increases.

Fifth, performance on the AIMSweb Math Winter Benchmarks was strongly associated with performance on the WJ-III and the TAKS Math Test. The use of both AIMSweb Winter Benchmarks provides more information about how a student is performing compared to his or her peers than using either Benchmark alone. If school personnel must use only one Benchmark, the AIMSweb Math Computation Winter Benchmark is more accurate in predicting math achievement in Third and Fourth Grade, while the AIMSweb Concepts and Applications Winter Benchmark is more accurate in predicting math achievement in Fifth Grade. Because of this strong association, school personnel should feel comfortable using the AIMSweb Winter Benchmarks when making instructional decisions, and assessment specialists may want to consider a student's performance on these Winter Benchmarks when determining eligibility for intervention or special education services.

Recommendations for Future Research

Based on the results of the present study, there are several directions that future researchers should consider. First, it is recommended that the study be replicated using a different elementary school, possibly in another school district or geographical region. The participants in this study were recruited from only one elementary school in one school district. For this reason, it is possible that the results obtained from this study may be the result of something that is unique to this particular school, its climate, its teachers, etc. By using participants from an elementary school in another school district or geographic region, the influence of any extraneous variables unique to the particular campus or school district from which the participants were recruited for this study would be removed, making it possible to generalize any results consistent with those obtained in this study to all elementary school students in upper grades, which is the target population of interest. Second, future researchers might want to consider comparing performance among different subgroups of students that were not examined in this study. For example, future researchers might want to examine the difference in strategy use between students who have a learning disability and students without a learning disability. Furthermore, future researchers should consider examining the impact of language proficiency on learning and study strategy use. The present study supports the use of the SMALSI in research examining strategy use. Future researchers should consider using the SMALSI in future experimental research as a pre- and post-measure to evaluate the effectiveness of interventions designed to enhance strategy use in students. Finally, the SMALSI is a measure of general learning and study strategies. There are many learning and study strategies that are unique to the subject of mathematics. Many of these strategies are included in items on the SMALSI, but it is possible that these strategies may be overshadowed by other strategies on the SMALSI that do not apply to mathematics. For this reason, it is recommended that future researchers consider designing a multidimensional measure of learning and study strategies covering specifically those strategies that apply to mathematics. Once such a measure is created, it is recommended that this study be replicated using that measure and the results be compared to the present study. Because little research has been done examining strategy use and mathematics, there are many directions that a future researcher might take and all of them are sure to provide a substantial contribution to the literature.

Summary

This study had two purposes. The first purpose was to examine the relationship between strategy use and math achievement using the School Motivation and Learning Strategies Inventory (SMALSI). The results show that a number of learning and study strategies, including reading and comprehension strategies, writing and research skills, test-taking strategies, study skills, time management and organizational techniques, and note taking and listening skills are all related to higher math achievement. These results support the use of the SMALSI for screening and identifying students who require explicit instruction in learning and study strategies and for monitoring the progress of students receiving intervention services. The second purpose was to examine the relationship between the AIMSweb Winter Benchmarks and math achievement. The results show that performance on the AIMSweb Winter Benchmarks is highly predictive of performance on norm-referenced and criterion-referenced measures of math achievement. These results support the use of the AIMSweb Winter Benchmarks for universal screening to identify students who are at-risk of underachievement in mathematics.

In recent years, educational research has started to change its focus from being ‘scientifically based’ to expanding on things that already exist (Viadero, 2009). This means that educational research is moving away from attempting to discover new approaches to solve problems and more toward examining things that are already in place and providing support for their continued use, identifying novel ways in which they can be used, or identifying ways in which they can be made better. The present study took two things already in place, the SMALSI and the AIMSweb Math Winter Benchmarks, and provided support for using them to screen and identify students requiring further assistance. By using these measures, school personnel can help students like John and Katherine, the two students mentioned in the Introduction, become more efficient learners and improve academic outcomes for all students.

REFERENCES

Adler, J. (1999). The dilemma of transparency: Seeing and seeing through talk in the mathematics class. *Journal for Research in Mathematics Education, 30*, 47-64.

Agostino, A., Johnson, J., & Pascual-Leone, J. (2010). Executive functions underlying multiplicative reasoning: Problem type matters. *Journal of Experimental Child Psychology, 105* (285-305).

Alexander, P. A., & Murphy, P. K. (1998). The research base for APA's learner-centered psychological principles. In N.M. Lambert & B. L. McCombs (Eds.), *How students learn: Reforming schools through learner-centered education* (pp. 25-60). Washington, D.C.: American Psychological Association.

Alexander, P. A., & Murphy, P. K. (1999). What cognitive psychology has to say to school psychology: Shifting perspectives and shared purposes. In C. R. Reynolds & T. B. Gutkin (Eds.), *The handbook of school psychology* (3rd ed., pp. 167-193). New York: Wiley.

Allison, P. D. (1999). *Multiple regression*. Thousand Oaks, CA: Pine Forge Press.

Allsopp, D. H. (1997). Using classwide peer tutoring to teach beginning algebra problem-solving skills in heterogeneous classrooms. *Remedial and Special Education, 18*, 367-379.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th-Text revision ed.). Washington, D.C.: American Psychiatric Association.

American Psychological Association. (2009). *Publication manual* (6th ed.). Washington, D.C.: American Psychological Association.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261-271.

Anderson, J., Reder, L., & Simon, H. (1996). Situated learning and education. *Educational Researcher, 25*, 5-11.

Annis, L. F. (1986). Improving study skills and reducing test anxiety in regular and low-achieving college students: The effects of a model course. *Techniques: A Journal of Remedial Education and Counseling, 2*, 115-125.

Arciuli, J., Rankine, T., & Monaghan, P. (2010). Auditory discrimination of voice-onset time and its relationship with reading ability. *Laterality, 15*, 343-360.

Ardoin, S. P., & Christ, T. J. (2008). Evaluating curriculum based measurement slope estimate using data from tri-annual universal screenings. *School Psychology Review, 37*, 109-125.

Aries, E., McCarthy, D., Salovev, P., & Banaji, M. (2004). Athletes at high selective colleges: Academic performance and personal development. *Research in Higher Education, 45*, 577-602.

Asbjornsen, A., & Bryden, M. (1998). Auditory attentional shifts in reading-disabled students: Quantification of attentional effectiveness by the attentional shift index. *Neuropsychologia, 36*, 143-148.

Asbjornsen, A., Helland, T., Obrzut, J., & Boliek, C. (2003). The role of dichotic listening performance and tasks of executive functions in reading impairment: A discriminant function analysis. *Child Neuropsychology, 94*, 227-288.

Aunio, P., & Niemivirta, M. (2010). Predicting children's mathematical performance in grade one by early numeracy. *Learning and Individual Differences, 20*, 427-435.

Badian, N. A. (1983). Dyscalculia and nonverbal disorders of learning. In H. R. Myklebust (Ed.), *Progress in learning disabilities* (pp. 235-264). New York: Grune & Stratton.

Baker, L., & Brown, A. L. (1984). Metacognitive skills in reading. In P. D. Pearson (Ed.), *Handbook of reading research* (pp. 353-394). New York: Longman.

Bakken, J. P., & Whedon, C. K. (2002). Teaching text structure to improve reading comprehension. *Intervention in School and Clinic, 37*, 229-233.

Baldry, N., & Hind, S. (2008). Auditory processing disorder in children: Awareness and attitudes of UK GPs and ENT consultants. *Audiological Medicine, 6*, 193-207.

Baloglu, M., & Zelhart, P. F. (2007). Psychometric properties of the revised mathematics anxiety rating scale. *The Psychological Record, 41*, 977-984.

Bamiou, D. E., Musiek, F. E., & Luxon, L. M. (2001). Aetiology and clinical presentations of auditory processing disorders: A review. *Archives of Disease in Childhood, 85*, 361-365.

Bandura, A. (1986). *Social foundations of thought and actions: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Barbaresi, W. J., Katusic, S. K., Colligan, R. C., Weaver, A. L., & Jacobsen, S. J. (2005). Math learning disorder: Incidence in a population-based birth cohort, 1976-1982. *Ambulatory Pediatrics, 5*, 281-289.

Barriga, A. Q., Doran, J. W., Newell, S. R., Morrison, E. M., Barbetti, V., & Robbins, B. D. (2002). Relationships between problem behaviors and academic achievement in adolescents: The unique role of attention problems. *Journal of Emotional and Behavioral Disorders, 10*, 233-240.

Beer, J., & Beer, J. (1992). Classroom and home study times and grades while at college using a single-subject design. *Psychological Reports, 71*, 233-234.

Beidel, D. C., Turner, M. W., & Trager, K. N. (1994). Test anxiety and childhood anxiety in African-American and White school children. *Journal of Anxiety Disorders, 8*, 169-179.

Benson, J. (1998). Developing a strong program of construct validation: A test anxiety example. *Educational Measurement: Issues and Practice, 17*, 10-22.

Berger, J. L., & Karabenick, S. A. (2011). Motivation and students' use of learning strategies: Evidence of unidirectional effects in mathematics classrooms. *Learning and Instruction, 21*, 416-428.

Berger, R. S., & Reid, D. K. (1989). Differences that make a difference: Comparisons of metacomponential functioning and knowledge base among groups of high and low IQ learning disabled, mildly mentally retarded, and normal achieving subjects. *Journal of Learning Disabilities, 22*, 422-429.

Berkeley, S., Scruggs, T. E., & Mastropieri, M. A. (2010). Reading comprehension instruction for students with learning disabilities, 1995-2006: A meta-analysis. *Remedial and Special Education, 31*, 423-436.

Biddlecomb, B., & Carr, M. (2011). A longitudinal study of the development of mathematics strategies and underlying counting schemes. *International Journal of Science and Mathematics Education, 9*, 1-24.

Biederman, J., Mick, E., Faraone, S. V., Braaten, E., Doyle, A., Spencer, T., et al. (2002). Influence of gender on attention-deficit hyperactivity disorder in children referred to a psychiatric clinic. *American Journal of Psychiatry, 159*, 36-42.

Biglan, A., Mrazek, P. J., Carnine, D., & Flay, B. R. (2003). The integration of research and practice in the prevention of youth problem behaviors. *American Psychologist, 58*, 433-441.

Billingsley, B. S., & Wildman, T. M. (1990). Facilitating reading comprehension in learning disabled students: Metacognitive goals and instructional strategies. *Remedial and Special Education, 11*(2), 18-31.

Binder, C. (1996). Behavioral fluency: Evolution of a new paradigm. *The Behavior Analyst, 19*, 163-197.

Birgin, O., Baloglu, M., Cathoglu, H., & Gurbuz, R. (2010). An investigation of mathematics anxiety among sixth through eighth grade students in Turkey. *Learning and Individual Differences, 20*, 654-658.

Bloom, B. (1956). *Taxonomy of educational objectives: The classification of educational goals*. New York: Longmans, Green.

Bloom, B. (1986). Automaticity: "The hands and feet of genius". *Educational Leadership, 43*, 70-77.

Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European Psychologist, 1*, 100-112.

Boekaerts, M., & Corno, L. (2005). Self-regulation in the classroom: A perspective on assessment and intervention. *Applied Psychology: An International Review, 54*, 199-231.

Boekaerts, M., & Niemivirta, M. (2000). Self-regulated learning: Finding a balance between learning goals and ego-protective goals. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 417-450). San Diego, CA: Academic Press.

Boesen, J., Lithner, J., & Palm, T. (2010). The relation between types of assessment tasks and the mathematical reasoning students use. *Educational Studies in Mathematics, 75*, 89-105.

Boller, B. (2008). Teaching organizational skills in middle school. *Education Digest, 74*(2), 52-55.

Borden, K. B., Brown, R. T., Jenkins, P., & Clingerman, S. R. (1987). Achievement attributions and depressive symptoms in attention deficit-disordered and normal children. *Journal of School Psychology, 25*, 399-404.

Bosse, M. J. (2003). The beauty of "and" and "or": Connections within mathematics for students with learning differences. *Mathematics and Computer Education, 37*, 105-114.

Boyle, G. J. (1991). Does item homogeneity indicate internal consistency or item redundancy in psychometric scales? *Personality and Individual Differences, 12*, 291-294.

Boyle, J. R. (2010). Note-taking skills of middle school students with and without learning disabilities. *Journal of Learning Disabilities, 43*, 530-540.

Brackney, B. E., & Karabenick, S. A. (1995). Psychopathology and academic performance: The role of motivation and learning strategies. *Journal of Counseling Psychology, 42*, 456-465.

Brinkmann, A. (2003). Graphical knowledge display--Mind mapping and concept mapping as efficient tools in mathematics education. *Mathematics Education Review, 16*, 35-48.

Britton, B. K., & Tesser, A. (1991). Effects of time-management practices on college grades. *Journal of Educational Psychology, 83*, 405-410.

Brophy, J. (2004). *Motivating students to learn* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Brown-Chidsey, R. (2005). Introduction to problem-solving assessment. In R. Brown-Chidsey (Ed.), *Assessment for intervention: A problem-solving approach* (pp. 3-9). New York: Guilford Press.

Brown-Chidsey, R., Loughlin, J. E., & O'Reilly, M. J. (2004). Using response to intervention methods with struggling learners. Dallas, TX: National Association of School Psychologists.

Brown-Chidsey, R., & Steege, M. W. (2005). *Response to Intervention: Principles and strategies for effective practice*. New York: Guilford.

Bruner, J. (1966). *Toward a theory of instruction*. New York: Norton.

Bryan, T., Burstein, K., & Bryan, J. (2001). Students with learning disabilities: Homework problems and promising practices. *Educational Psychologist, 36*, 167-180.

Bryan, T., & Nelson, C. (1995). Doing homework: Perspectives of elementary and middle school students. *Journal of Learning Disabilities, 27*, 488-499.

Bryant, B. R., Bryant, D. P., Kethley, C., Kim, S. A., Pool, C., & Seo, Y. (2008). Preventing mathematics difficulties in the primary grades: The critical features of instruction in textbooks as part of the equation. *Learning Disability Quarterly, 31*, 21-35.

Bryant, D. P., Bryant, B. R., Gersten, R., Scammacca, N. N., Funk, C., Winter, A., Shih, M., Pool, C. (2008). The effects of tier two intervention on the mathematics performance of first-grade students who are at risk for mathematics difficulties. *Learning Disability Quarterly, 31*, 47-63.

Bugden, S., & Ansari, D. (2011). Individual differences in children's mathematical competence are related to the intentional but not automatic processing of Arabic numerals. *Cognition, 118*, 32-44.

Burns, M. K., Codding, R. S., Boice, C. H., & Lukito, G. (2010). Meta-analysis of acquisition and fluency math interventions with instructional and frustrational level skills: Evidence for a skill-by-treatment interaction. *School Psychology Review, 39*, 69-83.

Burrill, G. (2001). Mathematics education: The future and the past create a context for today's issues. In T. Loveless (Ed.), *The great curriculum debate* (pp. 25-41). Washington, D.C.: Brookings Institution Press.

Butterworth, B. (2005). Developmental dyscalculia. In J. I. D. Campbell (Ed.), *Handbook of mathematical cognition* (pp. 455-467). New York: Psychology Press.

Buyse, M. (2000). Centralized treatment allocation in comparative clinical trials. *Applied Clinical Trials, 9*, 32-37.

Cain, K. (1996). *Story knowledge and comprehension skill*. Mahwah, NJ: Lawrence Erlbaum Associates.

Cantrell, S. C., Almasi, J. F., Carter, J. C., Rintamaa, M., & Madden, A. (2010). The impact of a strategy-based intervention on the comprehension and strategy use of struggling adolescent readers. *Journal of Educational Psychology, 102*, 257-280.

Carey, S. (2004). Bootstrapping and the origin of concepts. *Daedalus, 133*, 59-68.

Carpenter, T., Fennema, E., Franke, M., Levi, L., & Empson, S. (1993). *Rational numbers: An integration of research*. Hillsdale, NJ: Erlbaum.

Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioral self-regulation. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp. 42-85). San Diego, CA: Academic Press.

Case, L. P., Harris, K. R., & Graham, S. (1992). Improving the mathematical problem solving skills of students with learning disabilities: Self-regulated strategy development. *Journal of Special Education, 26*, 1-19.

Chall, J. S. (1983). *Stages of reading development*. New York: McGraw-Hill.

Chan, B. M., & Ho, C. S. (2010). The cognitive profile of Chinese children with mathematical difficulties. *Journal of Experimental Child Psychology, 107*, 260-279.

Charles, K. K., & Luoh, M. C. (2003). Gender differences in completed schooling. *Review of Economics and Statistics, 85*, 559-577.

Chazan, D. (2000). *Beyond formulas in mathematics teaching: Dynamics of the high school algebra classroom*. New York: Teachers College Press.

Chen, H. F., & Green, K. E. (2010). Minimization as an alternative to unrestricted randomization in educational research. *Educational Research Quarterly, 34*, 3-17.

Chen, S., & Zhou, J. (2010). Creative writing strategies of young children: Evidence from a study of Chinese emergent writing. *Thinking Skills and Creativity, 5*, 138-149.

Cheng, P. (1993). Metacognition and giftedness: The state of the relationship. *Gifted Child Quarterly, 37*, 105-112.

Chien, S. C. (2010). Enhancing English composition teachers' awareness of their students' writing strategy use. *The Asia-Pacific Education Researcher, 19*, 417-438.

Christ, T. J., & Schanding, G. T. (2007). Curriculum-based measures of computational skills: A comparison of group performance in novel, reward, and neutral conditions. *School Psychology Review, 36*, 147-158.

Church, M. A., Elliot, A. J., & Gable, S. L. (2001). Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of Educational Psychology, 93*, 43-54.

Cirino, P. T. (2011). The interrelationships of mathematical precursors in kindergarten. *Journal of Experimental Child Psychology, 108*, 713-733.

Cirino, P. T., Morris, M. K., & Morris, R. D. (2002). Neuropsychological concomitants of calculation skills in college students referred for learning difficulties. *Developmental Neuropsychology, 21*, 201-218.

Cirino, P. T., Morris, M. K., & Morris, R. D. (2007). Semantic, executive, and visuospatial abilities in mathematical reasoning of referred college students. *Assessment, 14*, 94-104.

Clark, C. A. C., Pritchard, V. E., & Woodward, L. J. (2010). Preschool executive functioning abilities predict early mathematics achievement. *Developmental Psychology, 46*, 1176-1191.

Clarke, B., Baker, S., Smolkowski, K., & Chard, D. J. (2008). An analysis of early numeracy curriculum-based measurement: Examining the role of growth in student outcomes. *Remedial and Special Education, 29*, 46-57.

Cobb, S., Peach, W., Craig, K., & Wilson, V. (1990). The effects of homework on academic performance of learning disabled and nonhandicapped math students. *Journal of Instructional Psychology, 16*, 168-171.

Cohen, D., & Hill, H. (2001). *Learning policy: When state education reform works*. New Haven, CT: Yale University Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: L. Erlbaum Associates.

Cohen, L. D., & Marks, K. S. (2002). How infants process addition and subtraction events. *Developmental Science, 5*, 186-201.

Coker, D., & Lewis, W. E. (2008). Beyond writing next: A discussion of writing research and instructional uncertainty. *Harvard Educational Review, 78*, 231-251.

Commission on the Skills of the American Workforce. (1990). *America's choice: High skills or low wages!* Rochester, NY: National Center on Education and the Economy.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*, 98-104.

Courville, T., & Thompson, B. (2001). Use of structure coefficients in published multiple regression articles: Beta is not enough. *Educational and Psychological Measurement, 61*, 229-248.

Coyne, M. D., Kame'enui, E. J., & Simmons, D. C. (2001). Prevention and intervention in beginning reading: Two complex systems. *Learning Disabilities Research and Practice, 16*, 62-74.

Coyne, M. D., Kame'enui, E. J., & Simmons, D. C. (2004). Improving beginning reading instruction and intervention for students with LD: Reconciling "all" with "each". *Journal of Learning Disabilities, 37*, 231-240.

Coyne, M. D., Kame'enui, E. J., Simmons, D. C., & Harn, B. A. (2004). Beginning reading intervention as inoculation or insulin: First-grade reading performance of strong responders to kindergarten intervention. *Journal of Learning Disabilities, 37*, 90-105.

Crede, M. (2010). Random responding as a threat to the validity of effect size estimates in correlational research. *Educational and Psychological Measurement, 70*, 596-612.

Creswell, C., Shildrick, S., & Field, A. P. (2011). Interpretation of ambiguity in children: A prospective study of associations with anxiety and parental interpretations. *Journal of Child and Family Studies, 20*, 240-250.

Cromley, J. G., Snyder-Hogan, L. E., & Luciw-Dubas, U. A. (2010). Reading comprehension of scientific text: A domain-specific test of the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology, 102*, 687-700.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of educational research, 49*, 222-251.

Cummins, J. (1980). The entry and exist fallacy in bilingual education. In C. Baker & N. H. Hornberger (Eds.), *An introductory reader to the writings of Jim Cummins* (pp. 110-138). Clevedon: Multilingual Matters.

Cybriwsky, C., & Schuster, J. (1990). Using constant time delay procedures to teach multiplication facts. *Remedial and Special Education, 11*, 54-59.

Dawes, P., & Bishop, D. V. M. (2009). Auditory processing disorder in relation to developmental disorders of language, communication, and attention: A review and critique. *International Journal of Language and Communication Disorders, 44*, 440-465.

De Clercq, A., Desoete, A., & Roeyers, H. (2000). EPA: A multilingual, programmable computer assessment of off-line metacognition in children with mathematical learning disabilities. *Behavior Research Methods, Instruments, and Computers, 32*, 304-311.

De Corte, E., Verschaffel, L., & Op't Eynde, P. (2000). Self-regulation: A characteristic and a goal of mathematics education. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 687-725). San Diego: Academic Press.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*, 109-134.

Decker, T. W. (1987). Multi-component treatment for academic underachievers. *Journal of College Student Psychotherapy, 1*(3), 29-37.

Dehaene, S., & Cohen, L. (1997). Cerebral pathways for calculation: Double disassociation between rote verbal and quantitative knowledge of arithmetic. *Cortex, 33*, 219-250.

Dembo, M. H., & Eaton, M. J. (1996). School learning and motivation. In G. D. Phye (Ed.), *Handbook of academic learning: Construction of knowledge* (pp. 66-105). San Diego: Academic Press.

Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children, 52*, 219-232.

Deshler, D. D., Palinscar, A. S., Biancarosa, G., & Nair, M. (2007). *Informed choices for struggling adolescent readers*. Newark, DE: International Reading Association.

DesJardins, S. L., B.P., M., Ott, M., & Kim, J. (2010). A quasi-experimental investigation of how the Gates Millennium Scholars Program is related to college students' time use and activities. *Educational Evaluation and Policy Analysis, 32*, 456-475.

Deslandes, R., Royer, E., Potvin, P., & Leclerc, D. (1999). Patterns of home and school partnership for general and special education students at the secondary level. *Exceptional Children, 65*, 496-506.

Desoete, A. (2006). Are mathematical learning disabilities a special kind of metacognitive disabilities? In A. Desoete & M. Veenman (Eds.), *Metacognition in mathematics education* (pp. 135-156). New York: Nova Science Publishers, Inc.

Desoete, A., & Roeyers, H. (2002). Off-line metacognition. A domain-specific retardation in young children with learning disabilities? *Journal of Learning Disabilities, 25*, 125-139.

Desoete, A., Roeyers, H., & Buysse, A. (2001). Metacognition and mathematical problem solving in grade 3. *Journal of Learning Disabilities, 34*, 435-449.

Desoete, A., Roeyers, H., Buysse, A., & De Clercq, A. (2002). Dynamic assessment of metacognitive skills in young children with mathematics learning disabilities. In D. Van der Aalsvoort, W.C.M. Resing & A. J. J. M. Ruijssenaars (Eds.), *Learning potential assessment and cognitive training* (pp. 307-333). England: JAI Press Inc./Elsevier Science Ltd.

Desoete, A., Roeyers, H., & De Clercq, A. (2004). Children with mathematics learning disabilities in Belgium. *Journal of Learning Disabilities, 37*, 50-61.

Desoete, A., Roeyers, H., & DeClercq, A. (2003). Can offline metacognition enhance mathematical problem solving? *Journal of Educational Psychology, 95*, 188-200.

Desoete, A., & Veenman, M. (2006). Metacognition in Mathematics: Critical issues on nature, theory, assessment, and treatment. In A. Desoete & M. Veenman (Eds.), *Metacognition in Mathematics Education* (pp. 1-10). New York: Nova Science Publishers, Inc.

DeZure, D., Kaplan, M., & Deerman, M. A. (2001). *Research on student notetaking: Implications for faculty and graduate student instructors*. Ann Arbor, MI: Center for Research on Learning and Teaching.

Diseth, A., & Kobbeltvedt, T. (2010). A mediation analysis of achievement motives, goals, learning strategies, and academic achievement. *British Journal of Educational Psychology, 80*, 671-687.

Doll, B., & Haack, K. M. (2005). Population-based strategies for identifying schoolwide problems. In R. Brown-Chidsey (Ed.), *Assessment for intervention: A problem-solving approach* (pp. 82-102). New York: Guilford.

Dolton, P., Marcenaro, O., & Navarro, L. (2003). The effective use of student time: A stochastic frontier production function case study. *Economics of Education Review, 22*, 547-560.

Donovan, M. S., & Cross, C. T. (2002). *Minority students in special and gifted education*. Washington, D.C.: National Academy Press.

Dorminy, K. P., Luscre, D., & Gast, D. L. (2009). Teaching organizational skills to children with high functioning autism and asperger's syndrome. *Education and Training in Developmental Disabilities, 44*, 538-550.

Dougherty, K. M., & Johnston, J. M. (1996). Overlearning, fluency, and automaticity. *The Behavior Analyst, 19*, 289-292.

Dreger, R. M., & Aiken, L. R. (1957). The identification of number anxiety in a college population. *Journal of Educational Psychology, 48*, 344-351.

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., et al. (2007). School readiness and later achievement. *Developmental Psychology, 43*, 1428-1446.

Dweck, C. S., & Leggett, E. L. (1988). A social cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

Eades, C., & Moore, W. M. (2007). Ideas in practice: Strategic note taking in developmental mathematics. *Journal of Developmental Education, 31*, 18-26.

Ellerton, N. F., & Clarkson, P. C. (1996). Language factors in mathematics teaching and learning. In A. J. Bishop, M. A. Clements, C. Keitel, J. Kilpatrick & C. Laborde (Eds.), *International handbook of mathematics education* (pp. 987-1033). Dordrecht: Kluwer.

Englert, C. S., & Thomas, C. C. (1987). Sensitivity to text structure in reading and writing: A comparison between learning disabled and non-learning disabled students. *Learning Disability Quarterly, 10*, 93-105.

Ewing, J. (1996). Mathematics: A century ago, a century from now. *Notices of the American Mathematics Society, 43*, 663-672.

Faigley, L., Cherry, R. D., Jolliffee, D. A., & Skinner, A. M. (1985). *Assessing writers' knowledge and processes of composing*. Norwood, NJ: Ablex.

Farrington-Flint, L., Vanuxem-Cotterill, S., & Stiller, J. (2009). Patterns of problem-solving in children's literacy and arithmetic. *British Journal of Developmental Psychology, 27*, 815-834.

Fast, L. A., Lewis, J. L., Bryant, M. J., Bocian, K. A., Cardullo, R. A., Rettig, M., et al. (2010). Does math self-efficacy mediate the effect of the perceived classroom environment on standardized math test performance. *Journal of Educational Psychology, 102*, 729-740.

Fearrington, J. Y., McCallum, R. S., & Skinner, C. H. (2011). Increasing math assignment completion using solution-focused brief counseling. *Education and Treatment of Children, 34*, 61-80.

Ferguson, M. A., Hall, R. L., Riley, A., & Moore, D. A. (2011). Communication, listening, cognitive and speech perception skills in children with auditory processing disorder (APD) or specific language impairment (SLI). *Journal of Speech, Language, and Hearing Research, 54*, 211-227.

Fisher, D., & Frey, N. (2004). *Improving adolescent literacy*. Upper Saddle River, NJ: Pearson Prentice Hall.

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp. 231-235). Hillsdale, NJ: Erlbaum.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34*, 906-911.

Flavell, J. H. (1981). Cognitive monitoring. In W. P. Dickson (Ed.), *Children's oral communication skills* (pp. 35-60). New York: Academic Press.

Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In F.E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 21-30). Hillsdale, NJ: Erlbaum.

Fleishner, J. E. (1994). Diagnosis and assessment of mathematics learning disabilities. In G. R. Lyon (Ed.), *Frames of reference for the assessment of learning disabilities: New views on measurement issues* (pp. 441-458). Baltimore: Brookes.

Fletcher, J. M. (2005). Predicting math outcomes: Reading predictors and comorbidity. *Journal of Learning Disabilities, 38*, 545-552.

Fletcher, J. M., Coulter, W. A., Reschly, D. J., & Vaughn, S. (2004). Alternative approaches to the definition and identification of learning disabilities: Some questions and answers. *Annals of Dyslexia, 54*, 304-331.

Fletcher, J. M., Foorman, B. R., Boudousquie, A., Barnes, M. A., Schatschneider, C., & Francis, D. J. (2002). Assessment of reading and learning disabilities: A research-based intervention oriented approach. *Journal of School Psychology, 40*, 27-63.

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2007). *Learning disabilities: From identification to intervention.* New York: Guilford.

Fletcher, J. M., Morris, R., & Lyon, G. R. (2003). Classification and definition of learning disabilities: An integrative perspective. In H.L. Swanson, K.R. Harris & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 30-56). New York: Guilford.

Floyd, R. G., Evans, J. J., & McGrew, K. S. (2003). Relations between measures of Cattell-Horn-Carroll (CHC) cognitive abilities and mathematics achievement across the school-age years. *Psychology in the Schools, 40*, 155-171.

Focant, J., Gregoire, J., & Desoete, A. (2006). Goal-setting, planning, and control strategies and arithmetical problem solving at grade 5. In A. Desoete & M. Veenman (Eds.), *Metacognition in mathematics education* (pp. 51-71). New York: Nova Science Publishers, Inc.

Foegen, A. (2008a). Algebra progress monitoring and interventions for students with learning disabilities. *Learning Disability Quarterly, 31*, 65-78.

Foegen, A. (2008b). Progress monitoring in middle school mathematics: Options and issues. *Remedial and Special Education, 29*, 195-207.

Foegen, A., & Morrison, C. (2010). Putting algebra progress monitoring into practice: Insights from the field. *Intervention in School and Clinic, 46*, 95-103.

Fontichiaro, K. (2011). Extracting relevant information and note taking. *School Library Monthly, 27*(4), 12-13.

Frieze, I. H. (1976). Causal attributions and information seeking to explain success and failure. *Journal of Research in Personality, 10*, 293-305.

Fuchs, D., & Deshler, D. D. (2007). What we need to know about responsiveness to intervention (and shouldn't be afraid to ask). *Learning Disabilities Research and Practice, 22*, 129-136.

Fuchs, D., Fuchs, L. S., & Compton, D. L. (2004). Identifying reading disabilities by responsiveness-to-instruction: Specifying measures and criteria. *Learning Disability Quarterly, 27*, 216-227.

Fuchs, D., & Young, C. (2006). On the irrelevance of intelligence in predicting responsiveness to reading instruction. *Exceptional Children, 73*, 8-30.

Fuchs, L. S., Compton, D. L., Fuchs, D., Paulsen, K., Bryant, J. D., & Hamlett, C. M. (2005). The prevention, identification, and cognitive determinants of math difficulty. *Journal of Educational Psychology, 97*, 493-513.

Fuchs, L. S., & Deno, S. L. (1991). Paradigmatic distinctions between instructionally relevant measurement models. *Exceptional Children, 57*, 488-501.

Fuchs, L. S., Deno, S. L., & Mirkin, P. K. (1984). Effects of frequent curriculum-based measurement on pedagogy, student achievement, and student awareness of learning. *American Educational Research Journal, 21*, 449-460.

Fuchs, L. S., & Fuchs, D. (1992). Identifying a measure for monitoring student reading progress. *School Psychology Review, 21*, 45-58.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A simplifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research and Practice, 4*, 204-219.

Fuchs, L. S., & Fuchs, D. (2007). The role of assessment in the three-tier approach to reading instruction. In D. Haager, J. Klingner & S. Vaughn (Eds.), *Evidence-based reading practices for response to intervention* (pp. 29-42). Baltimore, MD: Paul H. Brookes Publishing Co.

Fuchs, L. S., Fuchs, D., Compton, D. L., Powell, S. R., Seethaler, P. M., Capizzi, A. M., et al. (2006). The cognitive correlates of third-grade skill in arithmetic, algorithmic computation, and arithmetic word problems. *Journal of Educational Psychology, 98*, 29-43.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Thompson, A., Roberts, P. H., Kubek, P., et al. (1994). Technical features of a mathematics concepts and applications curriculum-based measurement system. *Diagnostique, 19*(4), 23-49.

Fuchs, L. S., Fuchs, D., Hamlett, C. M., & Appleton, A. C. (2002). Explicitly teaching for transfer: Effects on the mathematical problem solving performance of students with disabilities. *Learning Disabilities Research and Practice, 17*, 90-106.

Fuchs, L. S., Fuchs, D., Hosp, M., & Jenkins, J. R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading, 5*, 239-256.

Fuchs, L. S., Fuchs, D., Powell, S. R., Seethaler, P. M., Cirino, P. T., & Fletcher, J. M. (2008). Intensive intervention for students with mathematics disabilities: Seven principles of effective practice. *Learning Disability Quarterly, 31*, 79-92.

Fuchs, L. S., Fuchs, D., & Prentice, K. (2004). Responsiveness to mathematical problem solving treatment among students with risk for mathematics disability, with and without risk for reading disability. *Journal of Learning Disabilities, 27*, 273-306.

Fuchs, L. S., Fuchs, D., Prentice, K., Burch, M., Hamlett, C. M., Owen, R., et al. (2003). Enhancing third-grade students' mathematical problem solving with self-regulated learning strategies. *Journal of Educational Psychology, 95*, 306-315.

Fuchs, L. S., Fuchs, D., & Zumeta, R. O. (2008). A curricular-sampling approach to progress monitoring: Mathematics concepts and applications. *Assessment for Effective Intervention, 33*, 225-233.

Fuchs, L. S., Hamlett, C. L., Fuchs, D., Stecker, P. M., & Ferguson, C. (1988). Conducting curriculum-based measurement with computerized data collection: Effects on efficiency and teacher satisfaction. *Journal of Special Education Technology, 9*, 73-86.

Fuchs, L. S., Powell, S. R., Seethaler, P. M., Fuchs, D., Hamlett, C. L., Cirino, P. T., et al. (2010). A framework for remediating number combination deficits. *Exceptional Children, 76*, 135-156.

Fuson, K., Carroll, W., & Drueck, J. (2000). Achievement results for second and third graders using standards-based curriculum everyday mathematics. *Journal for Research in Mathematics Education, 31*, 277-295.

Gagne, R. (1970). *The conditions of learning* (2nd ed.). New York: Holt, Rinehart, & Winston.

Gagne, R. (1983). Some issues in the psychology of mathematics instruction. *Journal for Research in Mathematics Education, 14*, 7-18.

Gall, M. D., Gall, J. P., Jacobsen, D. R., & Bullock, T. L. (1990). *Tools for learning: A guide to teaching study skills*. Alexandria, VA: Association for Supervision and Curriculum Development.

Garner, R. (1988). Verbal-report data on cognitive and metacognitive strategies. In C.E. Weinstein, E.T. Goetz & P. A. Alexander (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 63-76). San Diego: Academic Press.

Geary, D. C. (1990). A componential analysis of an early learning deficit in mathematics. *Journal of Experimental Child Psychology, 49*, 363-383.

Geary, D. C. (1993). Mathematical disabilities: Cognitive, neuropsychological, and genetic components. *Psychological Bulletin, 114*, 345-362.

Geary, D. C. (2003). Learning disabilities in arithmetic: Problem-solving differences and cognitive deficits. In L. Swanson, K.R. Harris & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 199-212). New York: Guilford.

Geary, D. C. (2004). Mathematics and learning disabilities. *Journal of Learning Disabilities, 37*, 4-15.

Geary, D. C. (2005). Role of cognitive theory in the study of learning disability in mathematics. *Journal of Learning Disabilities, 38*, 305-307.

Geary, D. C., & Hoard, M. K. (2001). Numerical and arithmetical deficits in learning-disabled children: Relation to dyscalculia and dyslexia. *Aphasiology, 15*, 635-647.

Gelman, R., & Butterworth, B. (2005). Number and language: How are they related? *Trends in Cognitive Sciences, 9*, 6-10.

Gelman, R., & Gallistel, C. (1978). *The child's understanding of number*. Cambridge, MA: Harvard University Press.

Gersten, R., Fuchs, L. S., Williams, J. P., & Baker, S. (2001). Teaching reading comprehension strategies to students with learning disabilities: A review of research. *Review of Educational Research, 71*, 279-320.

Gettinger, M., & Seibert, J. K. (2002). Contributions of study skills to academic competence. *School Psychology Review, 31*, 350-365.

Ghanizedah, A. (2009). Screening signs of auditory processing problem: Does it distinguish attention deficit hyperactivity disorder subtypes in a clinical sample of children? *International Journal of Pediatric Otorhinolarygology, 73*, 81-87.

Ginsburg, H. (1977). *Children's arithmetic: The learning process*. New York: Van Nostrand.

Ginsburg, H., Klein, A., & Starkey, P. (1998). The development of children's mathematical thinking: Connecting research with practice. In I.E. Segal & K. A. Renninger (Eds.), *Handbook of child psychology* (5th ed., Vol. 4, pp. 401-476). New York: Wiley.

Gleason, M., Carnine, D., & Boriero, D. (1990). Improving CAI effectiveness with attention to instructional design in teaching story problems to mildly handicapped students. *Journal of Special Education Technology, 10*, 129-136.

Glennon, V. J. (1973). The slow learner in mathematics: Diagnostic-prescriptive teaching. *National Council of Teachers of Mathematics Yearbook, 34*, 282-318.

Glennon, V. J., & Wilson, J. W. (1972). Diagnostic-prescriptive teaching *The slow learner in mathematics, Thirty-fifth Yearbook of the National Council of Teachers of Mathematics*. Washington, D.C.: National Council of Teachers of Mathematics.

Goldman, S. (1989). Strategy instruction in mathematics. *Learning Disability Quarterly, 12*, 43-55.

Good R.H., Simmons, D. C., & Smith, S. B. (1998). Effective academic interventions in the United States: Evaluating and enhancing the acquisition of early reading skills. *School Psychology Review, 27*, 45-56.

Grabner, R. H., & DeSmedt, B. (in press). Neurophysiological evidence for the validity of verbal strategy reports in mental arithmetic. *Biological Psychology*.

Graham, S., Harris, K. R., MacARthur, C. A., & Schwartz, S. S. (1991). Writing and writing instruction with students with learning disabilities: A review of a program of research. *Learning Disability Quarterly, 14*, 89-114.

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*, 445-476.

Graham, S., & Perrin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*, 445-476.

Graham, S., Schwartz, S. S., & MacArthur, C. A. (1993). Knowledge of writing and the composing process, attitude toward writing, and self-efficacy for students with and without learning disabilities. *Journal of Learning Disabilities, 26*, 237-249.

Graney, S. B., Missall, K. N., Martinez, R. S., & Bergstrom, M. (2009). A preliminary investigation of within-year growth patterns in reading and mathematics curriculum-based measures. *Journal of School Psychology, 47*, 121-142.

Gravetter, F. J., & Wallnau, L. B. (2008). *Essentials of statistics for the behavioral sciences* (6th ed.). Belmont, CA: Thomson Wadsworth.

Gresham, F. M. (1999). Noncategorical approaches to K-12 emotional and behavioral difficultes. In D.J. Reschly, W.D. Tilly III & J. P. Grimes (Eds.), *Special education in transition: Functional assessment and noncategorical programming* (pp. 107-138). Longmont, CO: Sopris West.

Gresham, F. M. (2002a). Resonsiveness to intervention: An alternative approach to the identification of learning disabilities. In R. Bradley, L. Danielson & D. P. Hallahan (Eds.), *Identification of learning disabilities: Research to practice* (pp. 520-547). Mahwah, NJ: Lawrence Erlbaum Associates.

Gresham, F. M. (2002b). Response to treatment. In R. Bradley, L. Danielson & D. Hallahan (Eds.), *Identification of learning disabilities: Research to practice* (pp. 467-519). Mahwah, NJ: Lawrence Erlbaum Associates.

Gross-Tsur, V., Manor, O., & Shalev, R. (1996). Developmental dyscalculia: Prevalence and demographic features. *Developmental Medicine and Child Neurology, 38*, 25-33.

Grossman, F. J., Smith, B., & Miller, C. (1993). Did you say "write" in mathematics class? *Journal of Developmental Education, 17*, 2-35.

Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. *Learning and Individual Differences, 20*, 644-653.

Gullberg, J. (1997). *Mathematics: From the birth of numbers*. New York: W.W. Norton & Company, Inc.

Hale, J. B., Fiorello, C. A., Kavanagh, J. A., Hoeppner, J. B., & Gaither, R. A. (2001). WISC-III predictors of academic achievement for children with learning disabilities: Are global and factor scores comparable? *School Psychology Quarterly, 16*, 31-55.

Hallahan, D. P., & Mock, D. R. (2003). A brief history of the field of learning disabilities. In H.L. Swanson, K.R. Harris & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 16-29). New York: Guilford.

Hamill, D. D. (1993). A brief look at the learning disabilities movement in the United States. *Journal of Learning Disabilities, 26*, 295-310.

Hamman, D., Berthelot, J., Saia, J., & Crowley, E. (2000). Teachers' coaching of learning and its relation to students' strategic learning. *Journal of Educational Psychology, 92*, 342-348.

Hanich, L. B., Jordan, N. C., Kaplan, D., & Dick, J. (2001). Performance across different areas of mathematical cognition in children with learning difficulties. *Journal of Educational Psychology, 93*, 615-626.

Hannah, C. L., & Shore, B. M. (1995). Metacognition and high intellectual ability: Insights from the study of learning-disabled gifted students. *Gifted Child Quarterly, 39*, 95-109.

Haring, N., & Bateman, B. (1977). *Teaching the learning disabled child*. Englewood Cliffs, NJ: Prentice Hall.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Brookes.

Hasher, L., & Zacks, R. T. (1979). Automatic and effortful processes in memory. *Journal of Experimental Psychology: General, 108*, 356-388.

Hembree, R. (1988). Correlates, causes, effects, and treatment of test anxiety. *Review of educational research, 58*, 47-77.

Henley, M., Ramsey, R. S., & Algozzine, R. F. (2006). *Characteristics of and strategies for teaching students with mild disablities* (4th ed.). Boston, MA: Allyn and Bacon.

Henschen, S. E. (1919). Uber sprach-, musik-, und rechenmechanismen und ihre lokalisationen im grobhirn. *Zeitschrift fur die gesamte Neurologie und Psychiatrie, 52*, 273-298.

Hickendorff, M., van Putten, C. M., Verhelst, N. D., & Heiser, W. J. (2010). Individual differences in strategy use on division problems: Mental versus written computation. *Journal of Educational Psychology, 102*, 438-452.

Hiebert, J., Carpenter, T., Fennema, E., Fuson, K., Wearne, D., Murray, H., et al. (1996). Problem solving as a basis for reform in curriculum and instruction: The case of mathematics. *Educational Researcher, 25*(4), 12-21.

Hill, H. C., & Shih, J. C. (2009). Examining the quality of statistical mathematics education research. *Journal for Research in Mathematics Education, 40*, 241-250.

Hillcocks, G. (1986). *Research on written composition: New directions for teaching*. Urbana, IL: ERIC Clearinghouse on Reading and Communication Skills and the National Conference on Research in English.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*, 127-155.

Hintze, J., & Silberglitt, B. (2005). A longitudinal examination of the diagnostic accuracy and predictive validity of R-CBM and high stakes testing. *School Psychology Review, 34*, 372-386.

Ho, H. Z., Senturk, L. A. G., Zimmer, J. M., Hong, S., Okamoto, Y., Chiu, S. Y., et al. (2000). The affective and cognitive dimensions of math anxiety: A cross-national study. *Journal for Research in Mathematics Education, 31*, 362-379.

Hodapp, V., & Henneberger, A. (1983). Test anxiety, study habits, and academic performance. In H. M. v. d. Ploeg, R. Schwarzer & E. D. Spielberger (Eds.), *Advances in test anxiety research* (Vol. 2, pp. 119-127). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hodent, C., Bryant, P., & Houde, O. (2005). Language-specific effects on number computation in toddlers. *Developmental Science, 8*, 420-423.

Hong, E., & Karstensson, L. (2002). Antecedents of state test anxiety. *Contemporary Educational Psychology, 27*, 348-367.

Hood, A., Craig, K., & Ferguson, B. (1992). The impact of athletics, part-time employment, and other academic activities on academic achievement. *33,* 447-453.

Howell, S. C., & Kemp, C. R. (2010). Assessing preschool number sense: Skills demonstrated by children prior to school entry. *Educational Psychology, 30*, 411-429.

Hugdahl, K., & Andersson, L. (1984). A dichotic listening study of differences in cerebral organisation in dextral and sinistral subjects. *Cortex, 20*, 135-141.

Hugdahl, K., & Andersson, L. (1986). The "forced-attention paradigm" in dichotic listening to CV-syllables: A comparison between adults and children. *Cortex, 22*, 417-432.

Hughes, C. A., & Deshler, D. D. (1993). Test-taking strategy instruction for adolescents with emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders, 1*, 189-198.

Hughes, C. A., Ruhl, K. L., Schumaker, J. B., & Deshler, D. D. (2002). Effects of instruction in an assignment completion strategy on the homework performance of students with learning disabilities in general education classes. *Learning Disabilities Research and Practice, 17*, 1-18.

Hughes, C. A., & Schumacher, J. B. (1991). Test-taking strategy instruction for adolescents with learning disabilities. *Exceptionality, 4*, 205-226.

Hunter, J. E., & Schmidt, F. L. (2001). *Methods of meta-analysis: Correcting error and bias in research findings.* Thousand Oaks, CA: Sage.

Hutchinson, N. L. (1993). Effects of cognitive strategy instruction on algebra problem solving of adolescents with learning disabilities. *Learning Disability Quarterly, 16*, 34-63.

Individuals with Disabilities Education Improvement Act. (2004). *Individuals with Diabilities Education Improvement Act of 2004 P.L. 108-446, 20 U.S.C., 1400 eq seq.*

Ikeda, M. J., Tilly, W. D. I., Stumme, J., Volmer, L., & Allison, R. (1996). Agency-wide implementation of problem solving consultation: Foundations, current implementation, and future directions. *School Psychology Quarterly, 11*, 228-243.

Isaacs, G. (1994). Lecturing practices and note-taking purposes. *Studies in Higher Education, 19*, 203-216.

Jacob, B. A. (2002). Where the boys aren't: Non-cognitive skills, returns to school, and the gender gap in higher education. *Economics of Education Review, 21*, 589-598.

Janvier, C. (1987). *Problems of representation in the teaching and learning of mathematics*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Jayanthi, M., Sawyer, V., Nelson, J. S., Bursuck, W. D., & Epstein, M. H. (1995). Recommendations for homework-communication problems. *Remedial and Special Education, 16*, 212-225.

Jeary, J. (2007). School Motivation and Learning Strategies Inventory: A test review. *Canadian Journal of School Psychology, 22*, 262-269.

Jitendra, A. K., Star, J. R., Starosta, K., Leh, J. M., Sood, S., Caskie, G., et al. (2009). Improving seventh grade students' learning of ratio and proportion: The role of schema-based instruction. *Contemporary Educational Psychology, 34*, 250-264.

Johnson, K. R., & Layng, T. V. J. (1992). Breaking the structuralist barrier: Literacy and numeracy with fluency. *American Psychologist, 47*, 1475-1490.

Jones, L., & Pettruzzi, D. C. (1995). Test anxiety: A review of theory and current treatment. *Journal of College Student Psychotherapy, 10*, 3-15.

Jones, P., & Coxford, A. (1970). Mathematics in the evolving schools. In N. C. o. T. o. Mathematics (Ed.), *A history of mathematics education in the United States and Canada* (pp. 11-92). Washington, D.C.: National Council of Teachers of Mathematics.

Kasmer, L., & Kim, O. (2011). Using prediction to promote mathematical understanding and reasoning. *School Science and Mathematics, 111*, 20-33.

Kavale, K. A. (2003). *The feasability of a responsiveness to intervention approach for the identification of specific learning disability: A psychometric alternative*. Paper presented at the Response-to-Intervention Symposium. Retrieved from http://www.nrcld.org/html/symposium2003

Kavale, K. A., & Forness, S. R. (2000). What definitions of learning disability say and don't say: A critical analysis. *Journal of Learning Disabilities, 33*, 239-256.

Kebritchi, M., Hirumi, A., & Bai, H. (2010). The effects of modern mathematics computer games on mathematics achievement and class motivation. *Computers and Education, 55*, 427-443.

Keeler, M. L., & Swanson, H. L. (2001). Does strategy knowledge influence working memory in children with mathematical disabilities? *Journal of Learning Disabilities, 34*, 418-434.

Keith, T. Z. (1999). Effects of general and specific abilities on student achievement: Similarities and differences across ethnic groups. *School Psychology Quarterly, 14*, 239-262.

Keller-Margulis, M. A., Shapiro, E. S., & Hintze, J. M. (2008). Long-term diagnostic accuracy of curriculum-based measures in reading and mathematics. *School Psychology Review, 37*, 374-390.

Keller, M. A., & Shapiro, E. S. (2005). *General outcome measures and performance on standardized tests: An examination of long-term predictive validity*. Paper presented at the National Association of School Psychologists.

Kenny, D. T., & Faunce, G. (2004). Effects of academic coaching on elementary and secondary school students. *Journal of Educational Research, 93*, 115-126.

Khemani, E., & Barnes, M. A. (2005). Calculation and estimation in typically developing children from grades three to eight. *Canadian Psychology, 46*, 219.

Kilpatrick, J. (1992). A history of research in mathematics education. In D. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 3-39). New York: MacMillan.

King, N. J., Mietz, A., Tinney, L., & Ollendick, T. H. (1995). Psychopathology and cognition in adolescents experiencing severe test anxiety. *Journal of Clinical Child Psychology, 24*, 49-54.

Kirk, S. A. (1963). Behavioral diagnosis and remediation of learning disabilities. *Conference on Exploring Problems of the Perceptually Handicapped Child, 1*, 1-23.

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior, 26*, 1237-1245.

Klein, D. (2003). A brief history of American K-12 mathematics education in the 20th century. In J. Royer (Ed.), *Mathematical cognition* (pp. 175-259). Greenwich, CT: Information Age Publishing.

Kline, R. B. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research*. Washington, D.C.: American Psychological Association.

Klingner, J. K., Urbach, J., Golos, D., Brownell, M., & Menon, S. (2010). Teaching reading in the 21st century: A glimpse at how special education teachers promote reading comprehension. *Learning Disability Quarterly, 33*, 59-74.

Kluwe, R. H. (1987). Executive decisions and regulation of problem solving behavior. In F.E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 31-64). Hillsdale, NJ: Lawrence Erlbaum Associates.

Konrad, M., Joseph, L. M., & Eveleigh, E. (2009). A meta-analytic review of guided notes. *Education and Treatment of Children, 32*, 421-444.

Kosc, L. (1970). Psychology and psychopathology of mathematical abilities. *Studia psychologica, 12*, 159-162.

Kramarski, B., & Hirsch, C. (2003). Effects of Computer Algebra System (CAS) with metacognitive training on mathematical reasoning. *Educational Media International, 40*, 249-257.

Kramarski, B., & Ritkof, R. (2002). The effects of metacognitive and email interactions on learning graphing. *Journal of Computer Assisted Learning, 18*, 33-43.

Kretlow, A. G., Lo, Y. Y., White, R. B., & Jordan, L. (2008). Teaching test-taking strategies to improve the academic achievement of students with mild mental disabilities. *Education and Training in Developmental Disabilities, 43*, 397-408.

Krinzinger, H., Kaufmann, L., & Willmes, K. (2009). Math anxiety and math ability in early primary school years. *Journal of Psychoeducational Assessment, 27*, 206-225.

Lagemann, E. (2000). *An elusive science: The troubling history of education research*. Chicago: University of Chicago Press.

Lago, R. M., & DiPerna, J. C. (2010). Number sense in Kindergarten: A factor-analytic study of the construct. *School Psychology Review, 39*, 164-180.

Lane, K. L., O'Shaughnessy, T. E., Lambros, K. M., Gresham, F. M., & Beebe-Frankenberger, M. E. (2001). The efficacy of phonological awareness training with first grade students who have behavior problems and reading difficulties. *Journal of Emotional and Behavioral Disorders, 9*, 219-231.

Lave, J. (1988). *Cognition in practice*. Cambridge, UK: Cambridge University Press.

Lee, K. (2010). Do early academic achievement and behavior problems predict long-term effects among Head Start children? *Children and Youth Services Review, 32*, 1690-1703.

Leinhardt, G., Putnam, R., & Hattrup, R. (1992). *Analysis of arithmetic for mathematics teaching*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Lemos, S. L. (1999). Student's goals and self-regulation in the classroom. *International Journal of Educational Research, 31*, 471-485.

Lerew, C. D. (2005). Understanding and implementing neuropsychologically-based arithmetic interventions. In R. d'Amato, E. Fletcher-Janzen & C. R. Reynolds (Eds.), *Handbook of school neuropsychology* (pp. 758-776). New York: John Wiley & Sons, Inc.

Lesh, R., & Zawojewski, J. (2007). Problem solving and modelin. In J. F.K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 629-668). Charlotte, NC: Information Age Publishing.

Levine, S. C., Suriyakham, L. W., Rowe, M. L., Huttenlocher, J., & Gunderson, E. A. (2010). What counts in the development of young children's number knowledge? *Developmental Psychology, 46*, 1309-1319.

Lewandowsky, M., & Stadelmann, E. (1908). Uber einen bemerkenswerten fall von hirnblutung und uber rechenstorungen bei herderkrankung des gehirns. *Journal fur Psychologie und Neurologie, 11*, 249-265.

Liebert, R. M., & Morris, L. W. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports, 20*, 975-978.

Lim, C. S., & Presmeg, N. (2011). Teaching mathematics in two languages: A teaching dilemma of malaysian chinese primary schools. *International Journal of Science and Mathematics Education, 9*, 137-161.

Linn, R., Baker, E., & Dunbar, S. (1991). Complex, performance-based assessment: Expectations and validation criteria. *Educational Researcher, 20*, 15-21.

Lubbers, M. J., Van der Werf, M. P. C., Kuyper, H., & Hendriks, A. A. J. (2010). Does homework behavior mediate the relation between personality and academic performance? *Learning and Individual Differences, 20*, 203-208.

Lucangeli, D., & Cabrele, S. (2006). The relationship of metacognitive knowledge, skills, and beliefs in children with and without mathematics learning disabilities. In A. Desoete & M. Veenman (Eds.), *Metacognition in mathematics education* (pp. 103-133). New York: Nova Science Publishers, Inc.

Macan T.H., Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). College students' time management correlations with academic performance and stress. *Journal of Educational Psychology, 82*, 760-768.

MacArthur, C. A., & Graham, S. (1987). Learning disabled students' composing with three methods: Handwriting, dictation, and word processing. *Journal of Special Education, 21*, 22-42.

Magi, K., Lerkkanen, M. K., Poikkeus, A. M., & Rasku-Puttonen, H. (2010). Relations between achievement goal orientations and math achievement in primary grades: A follow-up study. *Scandinavian Journal of Educational Research, 54*, 295-312.

Marsh, H. W. (1990). Causal ordering of academic self-concept and academic achievement: A multi-wave, longitudinal panel analysis. *Journal of Educational Psychology, 82*, 646-656.

Mason, L. H., Kubina, R. M., & Taft, R. J. (2011). Developing quick writing skills of middle school students with disabilities. *Journal of Special Education, 44*, 205-220.

Mastropieri, M. A., & Scruggs, T. E. (1992). Science for students with disabilities. *Review of Educational Research, 62*, 377-411.

Mastropieri, M. A., & Scruggs, T. E. (1994). Applications of mnemonic strategies with students with mild mental disabilities. *Remedial and Special Education, 15*, 34-44.

Mather, N., & Woodcock, R. W. (2001). *Woodcock-Johnson III: Tests of achievement*. Itasca, IL: Riverside Publishing Co.

Maxwell, M. (1994). Are the skills we are teaching obsolete? In S. Mioduski & G. Enright (Eds.), *Proceedings of the 13th and 14th Annual Institutes for Learning Assistance Professionals* (pp. 63-77). Tucson, AZ: University Learning Center, University of Arizona.

Mayer, R. E. (1988). Learning strategies: An overview. In C.E. Weinstein, E.T. Goetz & P. A. Alexander (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 11-24). San Diego: Academic Press.

Mazzocco, M. M. M., & Myers, G. F. (2003). Complexities in identifying and defining mathematics learning disability in the primary school-age years. *Annals of Dyslexia, 53*, 218-253.

McBride, G., Dumont, R., & Willis, J. O. (2004). Response to intervention legislation: Have we found a better way or will we be just as confused as we have been for the last ten years? *The School Psychologist, 58*, 86-91.

McBurney, D. H., & White, T. L. (2007). *Research methods* (7th ed.). Belmont, CA: Thomson Wadsworth.

McCaffrey, D., Hamilton, L., Stecher, B., Klein, S., Bugliari, D., & Robyn, A. (2001). Interactions among instructional practices, curriculum, and student achievement: The case of standards-based high school mathematics. *Journal for Research in Mathematics Education, 32*, 493-517.

McCloskey, M., & Caramazza, A. (1985). Cognitive mechanisms in number processing and calculation: Evidence from dyscalculia. *Brain and Cognition, 4*, 171-196.

McGrew, K. S., Flanagan, D. P., Keith, T. Z., & Vanderwood, M. (1997). Beyond g: The impact of the Gc-Gf specific cognitive abilities research on the future use and interpretation of intelligence tests in the schools. *School Psychology Review, 26*, 189-210.

McGrew, K. S., & Wendling, B. J. (2010). Cattell-Horn-Carroll cognitive-achievement relations: What we have learned from the past twenty years of research. *Psychology in the Schools, 47*, 651-675.

Meltzer, L., Roditi, B., Houser, R. F. J., & Perlman, M. (1998). Perceptions of academic strategies and competence in students with learning disabilities. *Journal of Learning Disabilities, 31*, 437-451.

Mercer, N. (1995). *The guided construction of knowledge: Talk among teachers and learners*. Clevedon: Multilingual Matters.

Mevarech, Z. M., & Kramarski, B. (1997). IMPROVE: A multidimensional method for teaching mathematics in heterogeneous classrooms. *American Educational Research Journal, 34*, 365-394.

Mevarech, Z. M., & Kramarski, B. (2003). The effects of metacognitive training versus worked-out examples on students' mathematical reasoning. *British Journal of Educational Psychology, 73*, 449-471.

Millman, J., Bishop, C. H., & Ebel, R. (1965). An analysis of test-wiseness. *Educational and Psychological Measurement, 25*, 707-726.

Miranda, A., Villaescusa, M. I., & Vidal-Abarca, E. (1997). Is attribution retraining necessary? Use of self-regulation procedures for enhancing the reading comprehension strategies of children with learning disabilities. *Journal of Learning Disabilities, 30*, 503-512.

Mix, K. S., Huttenlocher, J., & Levine, S. C. (2002). Multiple cues for quantification in infancy: Is number one of them? *Psychological Bulletin, 128*, 278-294.

Moely, B. E., Santulli, K. A., & Obach, M. S. (1995). Strategy instruction, metacognition, and motivation in the elementary school classroom. In F. E. Weinert & W. Schneider (Eds.), *Memory performance and competencies: Issues in growth and development* (pp. 301-321). Hillsdale, NJ: Lawrence Erlbaum Associates.

Monette, S., Bigras, M., & Guay, M. C. (2011). The role of the executive functions in school achievement at the end of the Grade 1. *Journal of Experimental Child Psychology, 109*, 158-173.

Montague, M. (1992). The effects of cognitive and metacognitive strategy instruction on the mathematical problem solving of middle school students with learning disabilities. *Journal of Learning Disabilities, 25*, 230-248.

Montague, M. (2008). Self-regulation strategies to improve mathematical problem solving for students with learning disabilities. *Learning Disability Quarterly, 31*, 37-44.

Montague, M., Applegate, B., & Marquard, K. (1993). Cognitive strategy instruction and mathematical problem-solving performance of students with learning disabilities. *Learning Disabilities Research and Practice, 8*, 223-232.

Montague, M., & Dietz, S. (2009). Evaluating the evidence base for cognitive strategy instruction and mathematical problem solving. *Exceptional Children, 75*, 285-302.

Montague, M., & Leavell, A. G. (1994). Improving the narrative writing of students with learning disabilities. *Remedial and Special Education, 15*, 21-33.

Montague, M., Penfield, R. D., Enders, C., & Huang, J. (2010). Curriculum-based measurement of math problem solving: A methodology and rationale for establishing equivalence of scores. *Journal of School Psychology, 48*, 39-52.

Montague, M., & van Garderen, D. (2008). Effective mathematics instruction. In R. Morris & N. Mather (Eds.), *Evidence-based interventions for students with learning and behavioral challenges.* (pp. 236-257). New York: Routledge.

Moon, B. (1986). *The 'new maths' curriculum controversy: An international story*. Philadelphia: Falmer Press.

Moore, J. M. (2011). Keywords, bullets, and note taking with grades 2 and 3. *School Library Monthly, 27*(4), 14-15.

National Council of Teachers of Mathematics (1970). *A history of mathematics education in the United States and Canada*. Washington, D.C.: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics (1989). *Curriculum and evaluation: NCTM standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics (2000). *Principles and NCTM standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics (2006). *Curriculum focal points for prekindergarten through grade 8 mathematics: A quest for coherence*. Reston, VA: National Council of Teachers of Mathematics.

National Joint Committee on Learning Disabilities. (1988). *Letter to NJCLD member organizations*: National Joint Committee on Learning Disabilities.

Naveh-Benjamin, M. (1991). A comparison of training programs intended for different types of test-anxious students: Further support for an information-processing model. *Journal of Educational Psychology, 83*, 134-139.

Neubert, G. A., & McNelis, S. J. (1986). Improving writing in the disciplines. *Educational Leadership, 43*(7), 54-58.

Newbegin, I., & Owens, A. (1996). Self-esteem and anxiety in secondary school achievement. *Journal of Social Behavior and Personality, 11*, 521-530.

Newell, A., & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice Hall.

Ng, E., & Lee, K. (2010). Children's task performance under stress and non-stress conditions: A test of the processing efficiency theory. *Cognition and Emotion, 24*, 1229-1238.

Nicholls, J. G., McKenzie, M., & Shufro, J. (1994). Schoolwork, homework, and life's work: The experience of students with and without learning disabilities. *Journal of Learning Disabilities, 27*, 562-569.

Ning, H. K., & Downing, K. (2010). Connections between learning experience, study behaviour, and academic performance: A longitudinal study. *Educational Research, 52*, 457-468.

O'Melia, M. C., & Rosenberg, M. S. (1994). Effects of cooperative homework teams on the acquisition of mathematics skills by secondary students with mild disabilities. *Exceptional Children, 60*, 538-548.

O'Shaughnessy, T. E., Lane, K. L., Gresham, F. M., & Beebe-Frankenberger, M. E. (2003). Children placed at risk for learning and behavioral difficulties: Implementing a school-wide system of early identification and intervention. *Remedial and Special Education, 24*, 27-35.

Ogonosky, A. (2008). *The response to intervention handbook: Moving from theory to practice*. Austin, TX: Park Place Publications.

Ostad, S. A. (1998). Comorbidity between mathematics and spelling difficulties. *Logopedics Phoniatrics Vocology, 23*, 145-154.

Patrick, H., Ryan, A. M., & Pintrich, P. R. (1999). The differential impact of extrinsic and mastery goal orientation on males' and females' self-regulated learning. *Learning and Individual Differences, 11*, 153-171.

Pearson. (2008). AIMSWeb Progress Monitoring System. Retrieved September 4, 2009, from http://www.aimsweb.com

Pearson. (2009). *AIMSweb Mathematics Concepts and Applications Administration and Technical Manual*. San Antonio, TX: NCS Pearson, Inc.

Pennequin, V., Sorel, O., Nanty, I., & Fontaine, R. (2010). Metacognition and low achievement in mathematics: The effect of training in the use of metacognitive skills to solve mathematical word problems. *Thinking and Reasoning, 16*, 198-220.

Perels, F., Dignath, C., & Schmitz, B. (2009). Is it possible to improve mathematical achievement by means of self-regulation strategies? Evaluation of an intervention in regular math classes. *European Journal of Psychology of Education, 24*, 17-31.

Peritz, G. (1918). Zur Pathopsychologie des Rechnens. *Dtsch Z Nervenheilkd, 61*, 234-340.

Petridou, A., & Williams, J. (2010). Accounting for unexpected test responses through examinees' and their teachers' explanations. *Assessment in Education: Principles, Policy, and Practice, 17*, 357-382.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research, 31*, 459-470.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp. 451-502). San Diego, CA: Academic Press.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*, 33-40.

Polloway, E. A., Epstein, M. H., Bursuck, W. D., Jayanthi, M., & Cumblad, X. (1994). Homework practices of general education teachers. *Journal of Learning Disabilities, 27*, 500-509.

Polya, G. (1990). *How to solve it*. London: Penguin.

Poon, A. Y. K. (2004). Language policy in Hong Kong: Its impact on language education and language use in post-handover Hong Kong. *Journal of Taiwan Normal University: Humanities & Social Sciences, 49*, 53-74.

Porte, L. K. (2001). Cut and paste 101: New strategies for note-taking and review. *Teaching Exceptional Children, 34*(2), 14-20.

Powell, S. R., & Fuchs, L. S. (2010). Contribution of equal-sign instruction beyond word-problem tutoring for third-grade students with mathematics difficulty. *Journal of Educational Psychology, 102*, 381-394.

Prawat, R. S. (1989). Promoting access to knowledge, strategy, and disposition in students: A research synthesis. *Review of Educational Research, 59*, 1-41.

Preckel, F., Goetz, T., Pekrun, R., & Kleine, M. (2008). Gender differences in gifted and average-ability students: Comparing girls' and boys' achievement, self-concept, interest, and motivation in mathematics. *Gifted Child Quarterly, 52*, 146-159.

Proctor, B. E., Floyd, R. G., & Shaver, R. B. (2005). Cattell-Horn-Carroll broad cognitive ability profiles of low math achievers. *Psychology in the Schools, 42*, 1-12.

Raghubar, K., Cirino, P. T., Barnes, M., Ewing-Cobbs, L., Fletcher, J. M., & Fuchs, L. S. (2009). Errors in multi-digit arithmetic and behavioral inattention in children with math difficulties. *Journal of Learning Disabilities, 42*, 356-371.

Raghubar, K. P., Barnes, M. A., & Hecht, S. A. (2010). Working memory and mathematics: A review of developmental, individual difference, and cognitive approaches. *Learning and Individual Differences, 20*, 110-122.

Rappaport, D. (1966). *Understanding and teaching elementary school mathematics*. New York: Wiley.

Reschly, D. J. (2005). *RTI Paradigm Shift and the Future of SLD Diagnosis and Treatment*. Paper presented at the Annual Institute for Psychology in the Schools of the American Psychological Association.

Reschly, D. J., & Ysseldyke, J. E. (2002). Paradigm shift: The past is not the future. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology IV* (Vol. 1, pp. 3-20). Bathesda, MD: The National Association of School Psychologists.

Revelle, W., & Zinbarg, R. (2009). Coefficients alpha, beta, omega, and the glb: Comments on Sijtsma. *Psychometrika, 74*, 145-154.

Reynolds, C. R. (2008). RTI, neuroscience, and sense: Chaos in the diagnosis and treatment of learning disabilities. In E. Fletcher-Janzen & C. R. Reynolds (Eds.), *Learning disabilities in the era of RTI: Recommendations for diagnosis and intervention* (pp. 14-27). Hoboken, NJ: John Wiley & Sons, Inc.

Reynolds, C. R. (2009). *Determining the 'R' in RTI: Which score is the best score?* Paper presented at the Annual meeting of the National Association of School Psychologists, Boston, MA.

Reynolds, C. R., & Shaywitz, S. E. (2009a). Response to intervention: Prevention and remediation, perhaps. Diagnosis, no. *Child Development Perspectives, 3*, 44-47.

Reynolds, C. R., & Shaywitz, S. E. (2009b). Response to intervention: Ready or not? Or, From wait-to-fail to watch-them-fail. *School Psychology Quarterly, 24*, 130-145.

Reynolds, C. R., & Shirey, L. L. (1988). The role of attention in studying and learning. In C. E. Weinstein, E. T. Goetz & P. A. Alexander (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 77-100). San Diego: Academic Press.

Reynolds, C. R., & Voress, J. (2007). *Test of Memory and Learning* (2nd ed.). Austin, TX: Pro-Ed.

Rhodes, R. L., Ochoa, S. H., & Ortiz, S. O. (2005). *Assessing culturally and linguistically diverse students: A practical guide*. New York: Guilford.

Riccio, C. A., Cohen, M. J., Garrison, T., & Smith, B. (2005). Auditory processing measures: Correlation with neuropsychological measures of attention, memory, and behavior. *Child Neuropsychology, 11*, 363-372.

Riccio, C. A., Reynolds, C. R., Lowe, P., & Moore, J. J. (2002). The continuous performance test: A window on the neural substrates for attention? *Archives of Clinical Neuropsychology, 17*, 235-272.

Riedesel, C. (1967). *Guided discovery in elementary school mathematics*. New York: Appleton-Century-Crofts.

Rittle-Johnson, B., Siegler, R. S., & Alibali, M. W. (2001). Developing conceptual understanding and procedural skill in mathematics: An iterative process. *Journal of Educational Psychology, 93*, 346-362.

Rittle-Johnson, B., & Star, J. R. (2007). Does comparing solution methods facilitate conceptual and procedural knowledge? An experimental study on learning to solve equations. *Journal of Educational Psychology, 99*, 561-574.

Rivera, D. (1997). Mathematics education and students with learning disabilities: Introduction to the special series. *Journal of Learning Disabilities, 30*, 2-19.

Roehrig, A. P., Petscher, Y., Nettles, S. M., Hudson, R. F., & Torgesson, J. K. (2008). Accuracy of the DIBELS oral reading fluency measure for predicting third grade reading-comprehension outcomes. *Journal of School Psychology, 46*, 343-366.

Rojas, S. (2010). On the teaching and learning of physics problem solving. *Revista Mexicana de Fisica, 56*, 22-28.

Romano, E., Babchishin, L., Pagani, L. S., & Kohen, D. (2010). School readiness and later achievement: Replication and extension using a nationwide Canadian survey. *Developmental Psychology, 46*, 995-1007.

Romano, T. (1987). *Clearing the way: Working with teenage writers*. Portsmouth, NH: Heinemann Educational Books, Inc.

Rosenfield, S. A. (2000). Creating usable knowledge. *American Psychologist, 55*, 1347-1355.

Rosenfield, S. A., & Gravois, T. A. (1996). *Instructional consultation teams: Collaborating for change*. New York: Guilford.

Rourke, B. P. (1993). Arithmetic disabilities specific and otherwise: A neuropsychological perspective. *Journal of Learning Disabilities, 26*, 214-226.

Rourke, B. P., & Finlayson, M. A. J. (1978). Neuropsychological significance of variations in patterns of academic performance: Verbal and visual-spatial abilities. *Journal of Pediatric Psychology, 3*, 62-66.

Rowe, S. (2004). Discourse in activity and activity as discourse. In R. Rogers (Ed.), *An introduction to critical discourse analysis in education* (pp. 79-96). Mahwah, NJ: Lawrence Erlbaum Associates.

Rubinstein, O., & Tannock, R. (2010). Mathematics anxiety in children with developmental dyscalculia. *Behavioral and Brain Functions, 6*, 46-58.

Scheiter, K., Gerjets, P., & Schuh, J. (2010). The acquisition of problem-solving skills in mathematics: How animations can aid understanding of structural problem features and solution procedures. *Instructional Science, 38*, 487-502.

Schmidt, W., Jorde, D., Cogan, L., Barrier, E., Gonzalo, I., Moser, U., et al. (1996). *Characterizing pedagogical flow: An investigation of mathematics and science teaching in six countries*. Boston: Kluwer.

Schmidt, W., McKnight, C., & Raizen, S. (1997). *A splintered vision: An investigation of U.S. science and mathematics education*. Dordrecht, The Netherlands: Kluwer.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8*(350-353).

Schoenfeld, A. H. (1987). Cognitive science and mathematics education: An overview. In A. H. Schoenfeld (Ed.), *Cognitive science and mathematics education* (pp. 1-32). Hillsdale, NJ: Lawrence Erlbaum Associates.

Schoenfeld, A. H. (1992). *Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics*. New York: MacMillan.

Schoenfeld, A. H. (2002). Making mathematics work for all children: Issues of standards, testing, and equity. *Educational Researcher, 31*, 13-25.

Semrud-Clikeman, M., Fine, J., & Harder, L. (2005). Providing neuropsychological services to students with learning disabilities. In R. D'Amato, E. Fletcher-Janzen & C. R. Reynolds (Eds.), *Handbook of school neuropsychology* (pp. 403-424). New York: John Wiley & Sons, Inc.

Setati, M. (2005). Teaching mathematics in a primary multilingual classroom. *Journal for Research in Mathematics Education, 36*, 447-466.

Shalev, R., Manor, O., Auerbach, J., & Gross-Tsur, V. (1998). Persistence of developmental dyscalculia: What counts? Results of a three-year prospective follow-up study. *Journal of Pediatrics, 133*, 358-362.

Shalev, R., Manor, O., & Gross-Tsur, V. (2005). Developmental dyscalculia: A prospective six-year follow-up. *Developmental Medicine and Child Neurology, 47*, 121-125.

Shapiro, E. S., & Clemens, N. H. (2009). A conceptual model for evaluating system effects of response to intervention. *Assessment for Effective Intervention, 35*, 3-16.

Shapiro, E. S., Keller, M. A., Lutz, J. G., Santoro, L. E., & Hintze, J. M. (2006). Curriculum-based measures and performance on state assessment and standardized tests: Reading and math performance in Pennsylvania. *Journal of Psychoeducational Assessment, 24*, 19-35.

Shaywitz, S. E., & Shaywitz, B. A. (1992). *Attention-deficit disorder comes of age*. Austin, TX: Pro-Ed.

Shimabukuro, S., Prater, M., Jenkins, A., & Edelen-Smith, P. (1999). The effects of self-monitoring of academic performance on students with learning disabilities and ADD/ADHD. *Education and Treatment of Children, 22*, 397-414.

Shin, J., Deno, S. L., & Espin, C. (2000). Technical adequacy of the Maze task for curriculum-based measurement of reading growth. *Journal of Special Education, 34*, 164-173.

Shinn, M. (2005). *Who is LD? Theory, Research, and Practice*. Paper presented at the Annual Institute for Psychology in the Schools of the American Psychological Association.

Shore, B. M., & Dover, A. C. (1987). Metacognition, intelligence, and giftedness. *Gifted Child Quarterly, 31*, 37-39.

Silver, E. (1987). Cognitive theory and research. In A. Schoenfeld (Ed.), *Cognitive science and mathematics education* (pp. 33-60). Hillsdale, NJ: Lawrence Erlbaum Associates.

Silver, E. A., Ghousseini, H., Gosen, D., Charalambous, C., & Strawhun, B. (2005). Moving from rhetoric to praxis: Issues faced by teachers in having students consider multiple solutions for problems in the mathematics classroom. *Journal of Mathematical Behavior, 24*, 287-301.

Simmons, D. C., & Kame'enui, E. J. (1998). *What reading research tells us about children with diverse learning needs: Bases and basics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Singer-Dudek, J., & Greer, D. (2005). A long-term analysis of the relationship between fluency and the training and maintenance of complex math skills. *The Psychological Record, 55*, 361-376.

Singh, K., Bickley, P. G., Trivette, P., Keith, T. Z., Keith, P. B., & Anderon, E. (1995). The effects of four components of parental involvement on eight-grade student achievement: Structural analysis of NELS-88 data. *School Psychology Review, 24*, 299-317.

Skemp, R. (1987). *The psychology of learning mathematics*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Slade, D. L. (1986). Developing foundations for organizational skills. *Academic Therapy, 21*, 261-266.

Slife, B. D., Weiss, J., & Bell, T. (1985). Separability of metacognition and cognition: Problem solving in learning disabled and regular students. *Journal of Educational Psychology, 77*, 437-445.

Song, M., & Herman, R. (2010). Critical issues and common pitfalls in designing and conducting impact studies in education: Lessons learned from the What Works Clearinghouse (Phase I). *Educational Evaluation and Policy Analysis, 32*, 351-371.

Span, P., & Overtoom-Corsmit, R. (1986). Information processing by intellectually gifted pupils solving mathematical problems. *Educational Studies in Mathematics, 17*, 273-295.

Speaks, C., Niccum, N., Carney, E., & Johnson, C. (1981). Stimulus dominance in dichotic listening. *Journal of Speech and Hearing Research, 24*, 430-437.

Spelke, E. S., & Tsivkin, S. (2001). Initial knowledge and conceptual change: Space and number. In M. Bowerman & S. Levinson (Eds.), *Language acquisition and conceptual development*. Cambridge, UK: Cambridge University Press.

Spielberger, C. D. (1979). *Understanding stress and anxiety*. New York: Harper and Row.

Spielberger, C. D., & Vagg, P. R. (1995). *Test anxiety: A transactional process model*. Philadelphia, PA: Taylor and Francis.

Stanic, G., & Kilpatrick, J. (2003). *A history of school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Star, J. R., & Rittle-Johnson, B. (2009). It pays to compare: An experimental study on computational estimation. *Journal of Experimental Child Psychology, 102*, 408-426.

Starkey, P., Spelke, E. S., & Gelman, R. (1991). Toward a comparative psychology of number. *Cognition, 39*, 171-172.

Stock, P., Desoete, A., & Roeyers, H. (2006). *Focusing on mathematical disabilities: A search for definition, classification, and assessment*. Hauppauge, NY: Nova Science.

Strang, J. D., & Rourke, B. P. (1985). Arithmetic disability subtypes: The neuropsychological significance of specific arithmetic impairment in childhood. In B. P. Rourke (Ed.), *Neuropsychology of learning disabilities: Essentials of subtype analysis* (pp. 167-186). New York: Guilford.

Stroud, K. C., & Reynolds, C. R. (2006). *School Motivation and Learning Strategies Inventory (SMALSI)*. Los Angeles, CA: Western Psychological Services.

Stroud, K. C., & Reynolds, C. R. (2009). Assessment of learning strategies and related constructs in children and adolescents. In T. Gutkin & C. R. Reynolds (Eds.), *The handbook of school psychology* (4th ed.). New York: Wiley.

Sugai, G., & Smith, P. (1986). The equal additions method of subtraction taught with a modeling technique. *Remedial and Special Education, 7*, 40-48.

Swanson, D. (2011). Four key factors to estimate project time. *Writer, 124*(2), 13.

Swanson, H. L. (1999). *Interventions for students with learning disabilities: A meta-analysis of treatment outcomes*. New York: Guilford.

Swanson, H. L. (2000). Issues facing the field of learning disabilities. *Learning Disability Quarterly, 23*, 37-49.

Swanson, H. L., & Jerman, O. (2006). Math disabilities: A selective meta-analysis of the literature. *Review of Educational Research, 76*, 249-274.

Swanson, H. L., & Saez, L. (2003). Memory difficulties in children and adults with learning disabilities. In H. L. Swanson, K. R. Harris & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 182-198). New York: Guilford.

Texas Education Agency. (2007). *Texas Assessment of Knowledge and Skills: Technical Manual 2007-2008*. Austin, TX: Texas Education Agency.

Texas Education Agency. (2008). *Texas Assessment of Knowledge and Skills: An Information Booklet*. Austin, TX: Texas Education Agency.

Texas Education Agency. (2010a). *TAKS Performance Standards*. Austin, TX: Texas Education Agency.

Texas Education Agency. (2010b). *Technical Manual*. Austin, TX: Texas Education Agency.

Teeter, P. A. (1998). *Interventions for ADHD: Treatment in developmental context*. New York: Guilford.

Teong, S. K. (2003). The effect of metacognitive training on mathematical word-problem solving. *Journal of Computer Assisted Learning, 19*, 46-55.

Thevenot, C., Castel, C., Fanget, M., & Fayol, M. (2010). Mental subtraction in high- and lower-skilled arithmetic problem solvers: Verbal report versus operand-recognition paradigms. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 36*, 1242-1255.

Thiede, K. W., Anderson, M. C. M., & Therriault, D. (2003). Accuracy of metacognitive monitoring affects learning of texts. *Journal of Educational Psychology, 95*, 66-73.

Thompson, B. (1990). Don't forget the structure coefficients. *Measurement and Evaluation in Counseling and Development, 22*, 178-180.

Thompson, B. (2003). Understanding reliability and coefficient alpha, really. In B. Thompson (Ed.), *Contemporary thinking on reliability issues*. Newbury Park, CA: Sage.

Thompson, B. (2006). *Foundations of behavioral statistics: An insight-based approach*. New York: Guilford.

Thompson, C. J. (2009). Preparation, practice, and performance: An empirical examination of the impact of Standards-based instruction on secondary students' math and science achievement. *Research in Education, 81*, 53-62.

Thompson, D. R., Kersaint, G., Richards, J. L., & Rubenstein, R. N. (2008). *Mathematical literacy: Helping students make meaning in the middle grades*. Portsmouth, NH: Heinemann.

Thurber, R. S., Shinn, M., & Smolkowski, K. (2002). What is measured in mathematics tests? Construct validity of curriculum-based mathematics measures. *School Psychology Review, 31*, 498-513.

Tierney, R. J., & Dorroh, J. (2004). *How to write to learn science* (2nd ed.). Arlington, VA: National Science Teachers Association.

Tierney, R. J., & Shanahan, T. (1996). Research on the reading-writing relationship: Interactions, transactions, and outcomes. In R. Barr, M. L. Kamil, P. Mosenthal & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 246-280). White Plains, NY: Longman.

Tierney, R. J., Soter, A., O'Flahavan, J. F., & McGinley, W. (1989). The effects of reading and writing upon thinking critically. *Reading Research Quarterly, 24*, 134-173.

Tilly, W. D. I., Reschly, D. J., & Grimes, J. P. (1999). Disability determination in problem solving systems: Conceptual foundations and critical components. In D.J. Reschly, W.D. Tilly III & J. P. Grimes (Eds.), *Special education in transition: Functional assessment and non-categorical programming* (pp. 285-321). Longmont, CO: Sopris West.

Tobias, S. (1985). Test anxiety: Interference, defective skills, and cognitive capacity. *Educational Psychologist, 20*, 135-142.

Todd, L., Yasko, J., Collyar, D. E., Katz, M. L., Krasnov, C. L., Borwhat, M. J., et al. (2004). Managing accrual in cooperative group clinical trials. *Journal of Clinical Oncology, 22*, 2997-3002.

Tompkins, G. E. (1994). *Teaching writing: Balancing process and product* (2nd ed.). New York: Macmillan.

United States Department of Labor. (1991). *What work requires of schools: A SCANS report for America 2000*. Washington D.C.: Secretary's Commission on Achieving Necessary Skills.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., & Briere, N. M. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement, 52*, 1003-1017.

Van de Walle, J. A. (2007). *Elementary and middle school mathematics: Teaching developmentally* (6th ed.). Boston, MA: Pearson Education, Inc.

van der Meer, J., Jansen, E., & Torenbeek, M. (2010). 'It's almost a mindset that teachers need to change': First-year students' need to be inducted into time management. *Studies in Higher Education, 35*, 777-791.

Vander Meer, C. D., Lentz, F. E., & Stollar, S. (2005). *The relationship between oral reading fluency and statewide achievement testing in Ohio (Technical Report)*. Eugene, OR: University of Oregon.

VanDerHyden, A. M. (2010). Determining early mathematical risk: Ideas for extending the research. *School Psychology Review, 39*, 196-202.

Vanderwood, M. L., Linklater, D., & Healy, K. (2008). Predictive accuracy of nonsense word fluency for English language learners. *School Psychology Review, 37*, 5-17.

Vaughn, S., Wanzek, J., Woodruff, A. L., & Linan-Thompson, S. (2007). Prevention and early identification of students with reading disabilities. In D. Haager, J. Klingner & S. Vaughn (Eds.), *Evidence-based reading practices for response to intervention*. Baltimore, MD: Paul H. Brookes Publishing Co.

Veenman, M. V. J. (2006). The role of intellectual and metacognitive skills in math problem solving. In A. Desoete & M. Veenman (Eds.), *Metacognition in mathematics education* (pp. 35-50). New York: Nova Science Publishers, Inc.

Veenman, M. v. J., & Elshout, J. J. (1999). Changes in the relation between cognitive and metacognitive skills during the acquisition of expertise. *European Journal of Psychology of Education, 14*, 509-523.

Veenman, M. V. J., Elshout, J. J., & Meijer, J. (1997). The generality vs. domain-specificity of metacognitive skills in novice learning across domains. *Learning and Instruction, 7*, 187-209.

Veenman, M. V. J., Prins, F. J., & Elshout, J. J. (2002). Initial learning in a complex computer simulated environment: The role of metacognitive skills and intellectual ability. *Computers in Human Behavior, 18*, 327-342.

Vermeer, H. J. (1997). *Sixth-grade students' mathematical problem solving behavior: Motivational variables and gender differences*. UFB: Leiden University.

Vermeer, H. J., Boekaerts, M., & Seegers, G. (2000). Motivational and gender differences: Sixth grade students' mathematical problem-solving behavior. *Journal of Educational Psychology, 92*, 308-315.

Viadero, D. (2009). 'Scientifically based' giving way to 'development' and innovation'. *Education Week, 28*(19), 1-11.

Vukovic, R. K., Lesaux, N. K., & Siegel, L. S. (2010). The mathematics skills of children with reading difficulties. *Learning and Individual Differences, 20*, 639-643.

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

Wachsmuth, I. (1983). Skill automaticity in mathematics instruction: A response to Gagne. *Journal for Research in Mathematics Education, 14*, 204-209.

Waeytens, K., Lens, W., & Vandenberghe, R. (2002). Learning to learn: Teachers' conceptions of their supporting role. *Learning and Instruction, 12*, 305-322.

Weinstein, C. E., Husman, J., & Dierking, D. R. (2000). Self-regulation interventions with a focus on learning strategies. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 727-747). San Diego: Academic Press.

Wiederholt, J. L. (1974). Historical perspectives on the education of the learning disabled. In L. Mann & D. A. Sabatino (Eds.), *The second review of special education* (pp. 103-152). Austin, TX: Pro-Ed.

Wieman, R. (2011). Students' beliefs about mathematics: Lessons learned from teaching note taking. *Mathematics Teacher, 104*, 406-407.

Wigfield, A., & Eccles, J. S. (1989). Test anxiety in elementary and secondary school students. *Educational Psychologist, 24*, 159-183.

Wilson, K., & Korn, J. H. (2007). Attention during lectures: Beyond ten minutes. *Teaching of Psychology, 34*, 85-89.

Wilson, N. H., & Rotter, J. C. (1986). Anxiety management training and study skills counseling for students on self-esteem and test anxiety and performance. *The School Counselor, 9*, 18-31.

Wine, J. (1971). Test anxiety and direction of attention. *Psychological Bulletin, 76*(2), 92-104.

Winne, P. H. (1996). A metacognitive view of individual differences in self-regulated learning. *Learning and Individual Differences, 8*, 327-353.

Winne, P. H. (2001). Self-regulated learning viewed from models of information processing. In B.J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspective* (pp. 153-190). Mahwah, NJ: Lawrence Erlbaum Associates.

Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp. 750-768). San Diego, CA: Academic Press.

Wong, B. Y. L. (1996). Metacognition and learning disabilities. In B. Y. L. Wong (Ed.), *The ABCs of Learning Disabilities* (pp. 120-139). San Diego: Academic Press.

Wong, B. Y. L., Harris, K. R., Graham, S., & Butler, D. (2003). *Cognitive strategies instruction research in learning disabilities*. New York: Guilford.

Woodward, J. (2004). Mathematics education in the United States: Past to present. *Journal of Learning Disabilities, 37*, 16-31.

Woolley, G. (2010). Developing reading comprehension: Combining visual and verbal cognitive processes. *Australian Journal of Language and Literacy, 33*, 108-125.

World Health Organization (1992). *The ICD-10 classification of mental and behavioral disorders: Clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.

Wu, S. S., Meyer, M. L., Maeda, U., Salimpoor, V., Tomiyama, S., Geary, D., et al. (2008). Standardized assessment of strategy use and working memory in early mental arithmetic performance. *Developmental Neuropsychology, 33*, 365-393.

Wynn, K. (1992). Addition and subtraction by human infants. *Nature, 358*, 749-750.

Wynn, K. (2002). Do infants have numerical expectations or just perceptual preferences? *Developmental Science, 5*, 207-209.

Zentall, S. S., Harper, G. W., & Stormont-Spurgin, M. (1993). Children with hyperactivity and their organizational abilities. *Journal of Educational Research, 87*, 112-117.

Zimmerman, B. J. (1999). Commentary: Toward a cyclically interactive view of self-regulated learning. *International Journal of Educational Research, 31*, 545-551.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp. 13-41). San Diego, CA: Academic Press.

Zimmerman, B. J., Greenberg, D., & Weinstein, C. E. (1994). *Self-regulating academic study time: A strategy approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal, 23*, 614-628.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82*, 51-59.

APPENDIX A

FREQUENCY TABLES FOR THE MEASURES USED IN THE STUDY

Table A1a

Frequency Table for the WJ-III Broad Math Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
28	1	.6	.6
29	1	.6	1.1
38	1	.6	1.7
65	1	.6	2.3
71	1	.6	2.8
75	2	1.1	4.0
77	1	.6	4.5
81	2	1.1	5.7
83	3	1.7	7.4
85	4	2.3	9.7
86	2	1.1	10.8
87	2	1.1	11.9
88	7	4.0	15.9
89	6	3.4	19.3
90	6	3.4	22.7
91	5	2.8	25.6
92	7	4.0	29.5
93	4	2.3	31.8
94	3	1.7	33.5
95	5	2.8	36.4
96	10	5.7	42.0
97	7	4.0	46.0
98	3	1.7	47.7
99	4	2.3	50.0
100	5	2.8	52.8
101	8	4.5	57.4
102	7	4.0	61.4
103	4	2.3	63.6
104	1	.6	64.2
105	3	1.7	65.9
106	6	3.4	69.3
107	2	1.1	70.5
108	4	2.3	72.7
109	5	2.8	75.6
110	6	3.4	79.0
111	5	2.8	81.8
112	4	2.3	84.1
113	3	1.7	85.8
114	2	1.1	86.9
115	3	1.7	88.6
116	3	1.7	90.3
117	4	2.3	92.6
118	3	1.7	94.3
119	1	.6	94.9
120	2	1.1	96.0
121	3	1.7	97.7
123	2	1.1	98.9
132	1	.6	99.4
136	1	.6	100.0

Table A1b

Frequency Table for the WJ-III Brief Math Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
26	1	.6	.6
29	1	.6	1.1
37	1	.6	1.7
65	1	.6	2.3
71	1	.6	2.8
72	1	.6	3.4
76	1	.6	4.0
77	1	.6	4.5
80	1	.6	5.1
81	1	.6	5.7
82	2	1.1	6.8
83	1	.6	7.4
84	3	1.7	9.1
85	2	1.1	10.2
86	3	1.7	11.9
87	1	.6	12.5
88	7	4.0	16.5
89	5	2.8	19.3
90	6	3.4	22.7
91	9	5.1	27.8
92	4	2.3	30.1
93	2	1.1	31.2
94	6	3.4	34.7
95	6	3.4	38.1
96	7	4.0	42.0
97	4	2.3	44.3
98	6	3.4	47.7
99	9	5.1	52.8
100	6	3.4	56.2
101	2	1.1	57.4
102	8	4.5	61.9
103	5	2.8	64.8
104	3	1.7	66.5
105	6	3.4	69.9
106	4	2.3	72.2
107	4	2.3	74.4
108	5	2.8	77.3
109	4	2.3	79.5
110	2	1.1	80.7
111	6	3.4	84.1
112	4	2.3	86.4
113	3	1.7	88.1
114	2	1.1	89.2
115	3	1.7	90.9
116	3	1.7	92.6
117	2	1.1	93.8
118	2	1.1	94.9
119	2	1.1	96.0
120	1	.6	96.6
121	2	1.1	97.7
122	1	.6	98.3
123	1	.6	98.9
130	1	.6	99.4
132	1	.6	100.0

Table A1c

Frequency Table for the WJ-III Math Calculation Skills Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
16	1	.6	.6
29	1	.6	1.1
44	1	.6	1.7
67	1	.6	2.3
70	1	.6	2.8
72	1	.6	3.4
74	1	.6	4.0
78	1	.6	4.5
81	1	.6	5.1
82	1	.6	5.7
84	2	1.1	6.8
85	3	1.7	8.5
86	1	.6	9.1
87	2	1.1	10.2
88	2	1.1	11.4
89	5	2.8	14.2
90	6	3.4	17.6
91	9	5.1	22.7
92	6	3.4	26.1
93	1	.6	26.7
94	5	2.8	29.5
95	9	5.1	34.7
96	7	4.0	38.6
97	2	1.1	39.8
98	7	4.0	43.8
99	7	4.0	47.7
100	3	1.7	49.6
101	5	2.8	52.3
102	4	2.3	54.5
103	9	5.1	59.7
104	4	2.3	61.9
105	8	4.5	66.5
106	5	2.8	69.3
107	3	1.7	71.0
108	9	5.1	76.1
109	4	2.3	78.4
110	1	.6	79.0
111	4	2.3	81.2
112	4	2.3	83.5
113	2	1.1	84.7
114	2	1.1	85.8
115	3	1.7	87.5
116	5	2.8	90.3
117	3	1.7	92.0
118	4	2.3	94.3
119	2	1.1	95.5
120	2	1.1	96.6
121	2	1.1	97.7
124	2	1.1	98.9
128	1	.6	99.4
130	1	.6	100.0

Table A1d

Frequency Table for the WJ-III Calculation Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
19	1	.6	.6
33	1	.6	1.1
41	1	.6	1.7
71	1	.6	2.3
74	1	.6	2.8
75	1	.6	3.4
76	1	.6	4.0
79	1	.6	4.5
81	1	.6	5.1
84	2	1.1	6.2
86	4	2.3	8.5
88	5	2.8	11.4
89	6	3.4	14.8
90	4	2.3	17.0
91	5	2.8	19.9
92	7	4.0	23.9
93	4	2.3	26.1
94	6	3.4	29.5
95	5	2.8	32.4
96	3	1.7	34.1
97	4	2.3	36.4
98	9	5.1	41.5
99	10	5.7	47.2
100	5	2.8	50.0
101	2	1.1	51.1
102	9	5.1	56.2
103	5	2.8	59.1
104	8	4.5	63.6
105	5	2.8	66.5
106	9	5.1	71.6
107	4	2.3	73.9
108	9	5.1	79.0
109	3	1.7	80.7
110	4	2.3	83.0
111	3	1.7	84.7
112	1	.6	85.2
113	4	2.3	87.5
114	5	2.8	90.3
115	4	2.3	92.6
116	1	.6	93.2
117	6	3.4	96.6
118	1	.6	97.2
119	1	.6	97.7
120	1	.6	98.3
122	1	.6	98.9
124	1	.6	99.4
126	1	.6	100.0

Table A1e

Frequency Table for the WJ-III Math Fluency Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
56	1	.6	.6
59	1	.6	1.1
65	1	.6	1.7
76	2	1.1	2.8
77	3	1.7	4.5
79	2	1.1	5.7
81	2	1.1	6.8
82	3	1.7	8.5
84	3	1.7	10.2
85	2	1.1	11.4
86	1	.6	11.9
87	3	1.7	13.6
88	6	3.4	17.0
89	4	2.3	19.3
90	3	1.7	21.0
91	5	2.8	23.9
92	7	4.0	27.8
93	1	.6	28.4
94	9	5.1	33.5
95	5	2.8	36.4
96	4	2.3	38.4
97	2	1.1	39.8
98	13	7.4	47.2
99	3	1.7	48.9
100	10	5.7	54.5
101	6	3.4	58.0
102	5	2.8	60.8
103	5	2.8	63.6
104	3	1.7	65.3
105	5	2.8	68.2
106	3	1.7	69.9
107	4	2.3	72.2
108	4	2.3	74.4
109	3	1.7	76.1
110	6	3.4	79.5
111	1	.6	80.1
112	3	1.7	81.8
113	2	1.1	83.0
114	3	1.7	84.7
115	3	1.7	86.4
116	2	1.1	87.5
117	5	2.8	90.3
118	2	1.1	91.5
119	3	1.7	93.2
120	2	1.1	94.3
121	2	1.1	95.5
123	1	.6	96.0
124	1	.6	96.6
127	1	.6	97.2
128	2	1.1	98.3
133	1	.6	98.9
138	1	.6	99.4
146	1	.6	100.0

Table A1f

Frequency Tables for the WJ-III Math Reasoning Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
41	1	.6	.6
46	1	.6	1.1
50	1	.6	1.7
68	1	.6	2.3
74	2	1.1	3.4
77	1	.6	4.0
78	2	1.1	5.1
81	1	.6	5.7
82	2	1.1	6.8
83	2	1.1	8.0
84	2	1.1	9.1
85	6	3.4	12.5
87	3	1.7	14.2
88	3	1.7	15.9
89	7	4.0	19.9
90	4	2.3	22.2
91	4	2.3	24.4
92	7	4.0	28.4
93	8	4.5	33.0
94	7	4.0	36.9
95	10	5.7	42.6
96	3	1.7	44.3
97	4	2.3	46.6
98	2	1.1	47.7
99	8	4.5	52.3
100	4	2.3	54.5
101	5	2.8	57.4
102	5	2.8	60.2
103	8	4.5	64.8
104	6	3.4	68.2
105	3	1.7	69.9
106	5	2.8	72.7
107	6	3.4	76.1
108	3	1.7	77.8
109	3	1.7	79.5
110	2	1.1	80.7
111	6	3.4	84.1
112	5	2.8	86.9
113	3	1.7	88.6
114	2	1.1	89.8
115	2	1.1	90.9
116	1	.6	91.5
117	4	2.3	93.8
118	2	1.1	94.9
119	2	1.1	96.0
120	2	1.1	97.2
122	1	.6	97.7
125	1	.6	98.3
126	1	.6	98.9
129	1	.6	99.4
135	1	.6	100.0

Table A1g

Frequency Tables for the WJ-III Applied Problems Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
37	1	.6	.6
45	1	.6	1.1
50	1	.6	1.7
68	1	.6	2.3
69	1	.6	2.8
71	1	.6	3.4
76	1	.6	4.0
78	2	1.1	5.1
80	1	.6	5.7
81	1	.6	6.2
82	2	1.1	7.4
84	3	1.7	9.1
85	4	2.3	11.4
86	4	2.3	13.6
87	3	1.7	15.3
88	7	4.0	19.3
89	9	5.1	24.4
90	4	2.3	26.7
91	6	3.4	30.1
92	3	1.7	31.8
93	5	2.8	34.7
94	8	4.5	39.2
95	9	5.1	44.3
96	6	3.4	47.7
97	4	2.3	50.0
98	3	1.7	51.7
99	6	3.4	55.1
100	6	3.4	58.5
101	2	1.1	59.7
102	2	1.1	60.8
103	9	5.1	65.9
104	1	.6	66.5
105	4	2.3	68.8
106	4	2.3	71.0
107	4	2.3	73.3
108	7	4.0	77.3
109	4	2.3	79.5
110	6	3.4	83.0
111	2	1.1	84.1
112	3	1.7	85.8
113	4	2.3	88.1
114	2	1.1	89.2
115	8	4.5	93.8
116	1	.6	94.3
117	1	.6	94.9
118	1	.6	95.5
120	2	1.1	96.6
121	1	.6	97.2
123	1	.6	97.7
124	3	1.7	99.4
130	1	.6	100.0

Table A1h

Frequency Table for the WJ-III Quantitative Concepts Age-Based Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
43	1	.6	.6
52	1	.6	1.1
60	2	1.1	2.3
65	1	.6	2.8
76	2	1.1	4.0
77	1	.6	4.5
80	3	1.7	6.2
81	4	2.3	8.5
82	2	1.1	9.7
84	1	.6	10.2
85	1	.6	10.8
86	4	2.3	13.1
87	2	1.1	14.2
88	2	1.1	15.3
89	4	2.3	17.6
90	3	1.7	19.3
91	2	1.1	20.5
92	5	2.8	23.3
93	4	2.3	25.6
94	9	5.1	30.7
95	6	3.4	34.1
96	10	5.7	39.8
97	8	4.5	44.3
98	5	2.8	47.2
99	4	2.3	49.4
100	4	2.3	51.7
101	8	4.5	56.2
102	8	4.5	60.8
103	8	4.5	65.3
104	3	1.7	67.0
105	8	4.5	71.6
106	1	.6	72.2
107	5	2.8	75.0
108	3	1.7	76.7
109	3	1.7	78.4
110	4	2.3	80.7
111	2	1.1	81.8
112	2	1.1	83.0
113	4	2.3	85.2
114	9	5.1	90.3
115	3	1.7	92.0
116	6	2.8	94.9
118	2	1.1	96.0
119	2	1.1	97.2
120	1	.6	97.7
128	1	.6	98.9
130	1	.6	99.4
131	1	.6	100.0

Table A2a

Frequency Table for the WJ-III Broad Math Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
28	1	1.1	1.1
75	1	1.1	2.2
77	1	1.1	3.4
81	1	1.1	4.5
83	2	2.2	6.7
85	1	1.1	7.9
86	1	1.1	9.0
87	2	2.2	11.2
88	3	3.4	14.6
89	1	1.1	15.7
90	6	6.7	22.5
91	2	2.2	24.7
92	3	3.4	28.1
93	4	4.5	32.6
94	1	1.1	33.7
95	2	2.2	36.0
96	6	6.7	42.7
97	5	5.6	48.3
98	3	3.4	51.7
99	2	2.2	53.9
100	3	3.4	57.3
101	4	4.5	61.8
102	3	3.4	65.2
103	3	3.4	68.5
104	1	1.1	69.7
105	2	2.2	71.9
106	2	2.2	74.2
107	2	2.2	76.4
108	2	2.2	78.7
109	3	3.4	82.0
110	2	2.2	84.3
111	3	3.4	87.6
112	2	2.2	89.9
113	1	1.1	91.0
114	1	1.1	92.1
116	1	1.1	93.3
117	1	1.1	94.4
118	1	1.1	95.5
121	1	1.1	96.6
123	1	1.1	97.8
132	1	1.1	98.9
136	1	1.1	100.0

Table A2b

Frequency Table for the WJ-III Brief Math Age-Based Standard Scores, Female Participants

Score	**Frequency**	**Percent**	**Cumulative Percent**
26	1	1.1	1.1
71	1	1.1	2.2
77	1	1.1	3.4
80	1	1.1	4.5
81	1	1.1	5.6
83	1	1.1	6.7
84	1	1.1	7.9
85	2	2.2	10.1
86	1	1.1	11.2
88	4	4.5	15.7
89	3	3.4	19.1
90	3	3.4	22.5
91	6	6.7	29.2
92	1	1.1	30.3
93	1	1.1	31.5
94	4	4.5	36.0
95	3	3.4	39.3
96	5	5.6	44.9
97	2	2.2	47.2
98	3	3.4	50.6
99	3	3.4	53.9
100	3	3.4	57.3
101	1	1.1	58.4
102	7	7.9	66.3
103	4	4.5	70.8
104	3	3.4	74.2
105	3	3.4	77.5
106	3	3.4	80.9
107	1	1.1	82.0
108	2	2.2	84.3
110	2	2.2	86.5
111	1	1.1	87.6
112	2	2.2	89.9
113	2	2.2	92.1
114	1	1.1	93.3
115	2	2.2	95.5
116	1	1.1	96.6
122	1	1.1	97.8
130	1	1.1	98.9
132	1	1.1	100.0

Table A2c

Frequency Table for the WJ-III Math Calculation Skills Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
29	1	1.1	1.1
81	1	1.1	2.2
82	1	1.1	3.4
84	1	1.1	4.5
85	1	1.1	5.6
87	1	1.1	6.7
88	2	2.2	9.0
89	3	3.4	12.4
90	4	4.5	16.9
91	2	2.2	19.1
92	3	3.4	22.5
93	1	1.1	23.6
94	2	2.2	25.8
95	5	5.6	31.5
96	5	5.6	37.1
97	1	1.1	38.2
98	4	4.5	42.7
99	5	5.6	48.3
100	1	1.1	49.4
101	4	4.5	53.9
102	3	3.4	57.3
103	4	4.5	61.8
104	3	3.4	65.2
105	6	6.7	71.9
106	3	3.4	75.3
107	2	2.2	77.5
108	3	3.4	80.9
109	1	1.1	82.0
110	1	1.1	83.1
111	2	2.2	85.4
112	2	2.2	87.6
114	2	2.2	89.9
116	1	1.1	91.0
117	2	2.2	93.3
118	1	1.1	94.4
120	1	1.1	95.5
121	1	1.1	96.6
124	1	1.1	97.8
128	1	1.1	98.9
130	1	1.1	100.0

Table A2d

Frequency Table for the WJ-III Calculation Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
33	1	1.1	1.1
79	1	1.1	2.2
81	1	1.1	3.4
84	1	1.1	4.5
86	2	2.2	6.7
88	4	4.5	11.2
89	1	1.1	12.4
90	1	1.1	13.5
91	5	5.6	19.1
92	5	5.6	24.7
93	2	2.2	27.0
94	2	2.2	29.2
95	2	2.2	31.5
96	2	2.2	33.7
97	1	1.1	34.8
98	5	5.6	40.4
99	6	6.7	47.2
100	4	4.5	51.7
101	2	2.2	53.9
102	4	4.5	58.4
103	3	3.4	61.8
104	6	6.7	68.5
105	4	4.5	73.0
106	4	4.5	77.5
107	2	2.2	79.8
108	3	3.4	83.1
109	2	2.2	85.4
110	2	2.2	87.6
111	1	1.1	88.8
112	1	1.1	89.9
113	2	2.2	92.1
114	2	2.2	94.4
117	2	2.2	96.6
120	1	1.1	97.8
124	1	1.1	98.9
126	1	1.1	100.0

Table A2e

Frequency Table for the WJ-III Math Fluency Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
59	1	1.1	1.1
79	1	1.1	2.2
81	1	1.1	3.4
82	1	1.1	4.5
87	1	1.1	5.6
88	3	3.4	9.0
89	3	3.4	12.4
90	2	2.2	14.6
91	3	3.4	18.0
92	4	4.5	22.5
93	1	1.1	23.6
94	7	7.9	31.5
95	2	2.2	33.7
96	2	2.2	36.0
97	1	1.1	37.1
98	7	7.9	44.9
99	3	3.4	48.3
100	6	6.7	55.1
101	3	3.4	58.4
102	3	3.4	61.8
103	4	4.5	66.3
105	2	2.2	68.5
106	1	1.1	69.7
107	3	3.4	73.0
108	2	2.2	75.3
110	2	2.3	77.5
112	3	3.4	80.9
114	2	2.2	83.1
115	3	3.4	86.5
116	1	1.1	87.6
117	3	3.4	91.0
119	2	2.2	93.3
120	1	1.1	94.4
121	1	1.1	95.5
123	1	1.1	96.6
128	1	1.1	97.8
133	1	1.1	98.9
138	1	1.1	100.0

Table A2f

Frequency Table for the WJ-III Math Reasoning Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
41	1	1.1	1.1
74	1	1.1	2.2
77	1	1.1	3.4
78	1	1.1	4.5
82	2	2.2	6.7
83	2	2.2	9.0
84	1	1.1	10.1
85	5	5.6	15.7
87	1	1.1	16.9
88	1	1.1	18.0
89	4	4.5	22.5
90	1	1.1	23.6
91	4	4.5	28.1
92	2	2.2	30.3
93	4	4.5	34.8
94	3	3.4	38.2
95	5	5.6	43.8
96	2	2.2	46.1
97	1	1.1	47.2
98	2	2.2	49.4
99	3	3.4	52.8
100	3	3.4	56.2
101	4	4.5	60.7
102	2	2.2	62.9
103	5	5.6	68.5
104	3	3.4	71.9
105	3	3.4	75.3
106	3	3.4	78.7
107	4	4.5	83.1
109	2	2.2	85.4
110	1	1.1	86.5
111	2	2.2	88.8
112	3	3.4	92.1
113	1	1.1	93.3
117	1	1.1	94.4
120	2	2.2	96.6
122	1	1.1	97.8
125	1	1.1	98.9
135	1	1.1	100.0

Table A2g

Frequency Table for the WJ-III Applied Problems Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
37	1	1.1	1.1
68	1	1.1	2.2
71	1	1.1	3.4
78	2	2.2	5.6
80	1	1.1	6.7
82	1	1.1	7.9
84	1	1.1	9.0
85	1	1.1	10.1
86	3	3.4	13.5
87	2	2.2	15.7
88	6	6.7	22.5
89	3	3.4	25.8
90	2	2.2	28.1
91	2	2.2	30.3
92	1	1.1	31.5
93	3	3.4	34.8
94	4	4.5	39.3
95	6	6.7	46.1
96	3	3.4	49.4
97	2	2.2	51.7
98	2	2.2	53.9
99	5	5.6	59.6
100	5	5.6	65.2
101	2	2.2	67.4
103	5	5.6	73.0
104	1	1.1	74.2
105	2	2.2	76.4
106	2	2.2	78.7
108	3	3.4	82.0
109	1	1.1	83.1
110	1	1.1	84.3
112	2	2.2	86.5
113	3	3.4	89.9
114	1	1.1	91.0
115	4	4.5	95.5
117	1	1.1	96.6
123	1	1.1	97.8
124	1	1.1	98.9
130	1	1.1	100.0

Table A2h

Frequency Tables for the WJ-III Quantitative Concepts Age-Based Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
52	1	1.1	1.1
60	1	1.1	2.2
76	1	1.1	3.4
80	3	3.4	6.7
81	2	2.2	9.0
82	2	2.2	11.2
86	2	2.2	13.5
87	1	1.1	14.6
88	1	1.1	15.7
89	2	2.2	18.0
90	2	2.2	20.2
91	1	1.1	21.3
92	4	4.5	25.8
93	2	2.2	28.1
94	5	5.6	33.7
95	4	4.5	38.2
96	2	2.2	40.4
97	4	4.5	44.9
98	3	3.4	48.3
99	2	2.2	50.6
100	2	2.2	52.8
101	4	4.5	57.3
102	5	5.6	62.9
103	5	5.6	68.5
104	1	1.1	69.7
105	3	3.4	73.0
107	4	4.5	77.5
108	3	3.4	80.9
109	2	2.2	83.1
110	1	1.1	84.3
111	1	1.1	85.4
114	4	4.5	89.9
115	1	1.1	91.0
116	3	3.4	94.4
118	1	1.1	95.5
119	2	2.2	97.8
122	1	1.1	98.9
131	1	1.1	100.0

Table A3a

Frequency Tables for the WJ-III Broad Math Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
29	1	1.1	1.1
38	1	1.1	2.3
65	1	1.1	3.4
71	1	1.1	4.6
75	1	1.1	5.7
81	1	1.1	6.9
83	1	1.1	8.0
85	3	3.4	11.5
86	1	1.1	12.6
88	4	4.6	17.2
89	5	5.7	23.0
91	3	3.4	26.4
92	4	4.6	31.0
94	2	2.3	33.3
95	3	3.4	36.8
96	4	4.6	41.4
97	2	2.3	43.7
99	2	2.3	46.0
100	2	2.3	48.3
101	4	4.6	52.9
102	4	4.6	57.5
103	1	1.1	58.6
105	1	1.1	59.8
106	4	4.6	64.4
108	2	2.3	66.7
109	2	2.3	69.0
110	4	4.6	73.6
111	2	2.3	75.9
112	2	2.3	78.2
113	2	2.3	80.5
114	1	1.1	81.6
115	3	3.4	85.1
116	2	2.3	87.4
117	3	3.4	90.8
118	2	2.3	93.1
119	1	1.1	94.3
120	2	2.3	96.6
121	2	2.3	98.9
123	1	1.1	100.0

Table A3b

Frequency Tables for the WJ-III Brief Math Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
29	1	1.1	1.1
37	1	1.1	2.3
65	1	1.1	3.4
72	1	1.1	4.6
76	1	1.1	5.7
82	2	2.3	8.0
84	2	2.3	10.3
86	2	2.3	12.6
87	1	1.1	13.8
88	3	3.4	17.2
89	2	2.3	19.5
90	3	3.4	23.0
91	3	3.4	26.4
92	3	3.4	29.9
93	1	1.1	31.0
94	2	2.3	33.3
95	3	3.4	36.8
96	2	2.3	39.1
97	2	2.3	41.4
98	3	3.4	44.8
99	6	6.9	51.7
100	3	3.4	55.2
101	1	1.1	56.3
102	1	1.1	57.5
103	1	1.1	58.6
105	3	3.4	62.1
106	1	1.1	63.2
107	3	3.4	66.7
108	3	3.4	70.1
109	4	4.6	74.7
111	5	5.7	80.5
112	2	2.3	82.8
113	1	1.1	83.9
114	1	1.1	85.1
115	1	1.1	86.2
116	2	2.3	88.5
117	2	2.3	90.8
118	2	2.3	93.1
119	2	2.3	95.4
120	1	1.1	96.6
121	2	2.3	98.9
123	1	1.1	100.0

Table A3c

Frequency Tables for the WJ-III Math Calculation Skills Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
16	1	1.1	1.1
44	1	1.1	2.3
67	1	1.1	3.4
70	1	1.1	4.6
72	1	1.1	5.7
74	1	1.1	6.9
78	1	1.1	8.0
84	1	1.1	9.2
85	2	2.3	11.5
86	1	1.1	12.6
87	1	1.1	13.8
89	2	2.3	16.1
90	2	2.3	18.4
91	7	8.0	26.4
92	3	3.4	29.9
94	3	3.4	33.3
95	4	4.6	37.9
96	2	2.3	40.2
97	1	1.1	41.4
98	3	3.4	44.8
99	2	2.3	47.1
100	2	2.3	49.4
101	1	1.1	50.6
102	1	1.1	51.7
103	5	5.7	57.5
104	1	1.1	58.6
105	2	2.3	60.9
106	2	2.3	63.2
107	1	1.1	64.4
108	6	6.9	71.3
109	3	3.4	74.7
111	2	2.3	77.0
112	2	2.3	79.3
113	2	2.3	81.6
115	3	3.4	85.1
116	4	4.6	89.7
117	1	1.1	90.8
118	3	3.4	94.3
119	2	2.3	96.6
120	1	1.1	97.7
121	1	1.1	98.9
124	1	1.1	100.0

Table A3d

Frequency Tables for the WJ-III Calculation Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
19	1	1.1	1.1
41	1	1.1	2.3
71	1	1.1	3.4
74	1	1.1	4.6
75	1	1.1	5.7
76	1	1.1	6.9
84	1	1.1	8.0
86	2	2.3	10.3
88	1	1.1	11.5
89	5	5.7	17.2
90	3	3.4	20.7
92	2	2.3	23.0
93	2	2.3	25.3
94	4	4.6	29.9
95	3	3.4	33.3
96	1	1.1	34.5
97	3	3.4	37.9
98	4	4.6	42.5
99	4	4.6	47.1
100	1	1.1	48.3
102	5	5.7	54.0
103	2	2.3	56.3
104	2	2.3	58.6
105	1	1.1	59.8
106	5	5.7	65.5
107	2	2.3	67.8
108	6	6.9	74.7
109	1	1.1	75.9
110	2	2.3	78.2
111	2	2.3	80.5
113	2	2.3	82.8
114	3	3.4	86.2
115	4	4.6	90.8
116	1	1.1	92.0
117	4	4.6	96.6
118	1	1.1	97.7
119	1	1.1	98.9
122	1	1.1	100.0

Table A3e

Frequency Tables for the WJ-III Math Fluency Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
56	1	1.1	1.1
65	1	1.1	2.3
76	2	2.3	4.6
77	3	3.4	8.0
79	1	1.1	9.2
81	1	1.1	10.3
82	2	2.3	12.6
84	3	3.4	16.1
85	2	2.3	18.4
86	1	1.1	19.5
87	2	2.3	21.8
88	3	3.4	25.3
89	1	1.1	26.4
90	1	1.1	27.6
91	2	2.3	29.9
92	3	3.4	33.3
94	2	2.3	35.6
95	3	3.4	39.1
96	2	2.3	41.4
97	1	1.1	42.5
98	6	6.9	49.4
100	4	4.6	54.0
101	3	3.4	57.5
102	2	2.3	59.8
103	1	1.1	60.9
104	3	3.4	64.4
105	3	3.4	67.8
106	2	2.3	70.1
107	1	1.1	71.3
108	2	2.3	73.6
109	3	3.4	77.0
110	4	4.6	81.6
111	1	1.1	82.8
113	2	2.3	85.1
114	1	1.1	86.2
116	1	1.1	87.4
117	2	2.3	89.7
118	2	2.3	92.0
119	1	1.1	93.1
120	1	1.1	94.3
121	1	1.1	95.4
124	1	1.1	96.6
127	1	1.1	97.7
129	1	1.1	98.9
146	1	1.1	100.0

Table A3f

Frequency Tables for the WJ-III Math Reasoning Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
46	1	1.1	1.1
50	1	1.1	2.3
68	1	1.1	3.4
74	1	1.1	4.6
78	1	1.1	5.7
81	1	1.1	6.9
84	1	1.1	8.0
85	1	1.1	9.2
87	2	2.3	11.5
88	2	2.3	13.8
89	3	3.4	17.2
90	3	3.4	20.7
92	5	5.7	26.4
93	4	4.6	31.0
94	4	4.6	35.6
95	5	5.7	41.4
96	1	1.1	42.5
97	3	3.4	46.0
99	5	5.7	51.7
100	1	1.1	52.9
101	1	1.1	54.0
102	3	3.4	57.5
103	3	3.4	60.9
104	3	3.4	64.4
106	2	2.3	66.7
107	2	2.3	69.0
108	3	3.4	72.4
109	1	1.1	73.6
110	1	1.1	74.7
111	4	4.6	79.3
112	2	2.3	81.6
113	2	2.3	83.9
114	2	2.3	86.2
115	2	2.3	88.5
116	1	1.1	89.7
117	3	3.4	93.1
118	2	2.3	95.4
119	2	2.3	97.7
126	1	1.1	98.9
129	1	1.1	100.0

Table A3g

Frequency Tables for the WJ-III Applied Problems Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
45	1	1.1	1.1
50	1	1.1	2.3
69	1	1.1	3.4
76	1	1.1	4.6
81	1	1.1	5.7
82	1	1.1	6.9
84	2	2.3	9.2
85	3	3.4	12.6
86	1	1.1	13.8
87	1	1.1	14.9
88	1	1.1	16.1
89	6	6.9	23.0
90	2	2.3	25.3
91	4	4.6	29.9
92	2	2.3	32.2
93	2	2.3	34.5
94	4	4.6	39.1
95	3	3.4	42.5
96	3	3.4	46.0
97	2	2.3	48.3
98	1	1.1	49.4
99	1	1.1	50.6
100	1	1.1	51.7
102	2	2.3	54.0
103	4	4.6	58.6
105	2	2.3	60.9
106	2	2.3	63.2
107	4	4.6	67.8
108	4	4.6	72.4
109	3	3.4	75.9
110	5	5.7	81.6
111	2	2.3	83.9
112	1	1.1	85.1
113	1	1.1	86.2
114	1	1.1	87.4
115	4	4.6	92.0
116	1	1.1	93.1
118	1	1.1	94.3
120	2	2.3	96.6
121	1	1.1	97.7
124	2	2.3	100.0

Table A3h

Frequency Tables for the WJ-III Quantitative Concepts Age-Based Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
43	1	1.1	1.1
60	1	1.1	2.3
65	1	1.1	3.4
76	1	1.1	4.6
77	1	1.1	5.7
81	2	2.3	8.0
84	1	1.1	9.2
85	1	1.1	10.3
86	2	2.3	12.6
87	1	1.1	13.8
88	1	1.1	14.9
89	2	2.3	17.2
90	1	1.1	18.4
91	1	1.1	19.5
92	1	1.1	20.7
93	2	2.3	23.0
94	4	4.6	27.6
95	2	2.3	29.9
96	8	9.2	39.1
97	4	4.6	43.7
98	2	2.3	46.0
99	2	2.3	48.3
100	2	2.3	50.6
101	4	4.6	55.2
102	3	3.4	58.6
103	3	3.4	62.1
104	2	2.3	64.4
105	5	5.7	70.1
106	1	1.1	71.3
107	1	1.1	72.4
109	1	1.1	73.6
110	3	3.4	77.0
111	1	1.1	78.2
112	2	2.3	80.5
113	4	4.6	85.1
114	5	5.7	90.8
115	2	2.3	93.1
116	2	2.3	95.4
118	1	1.1	96.6
120	1	1.1	97.7
128	1	1.1	98.9
130	1	1.1	100.0

Table A4a

Frequency Tables for the WJ-III Broad Math Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
22	1	1.7	1.7
28	1	1.7	3.3
74	1	1.7	5.0
77	1	1.7	6.7
78	2	3.3	10.0
88	3	5.0	15.0
89	1	1.7	16.7
91	3	5.0	21.7
92	2	3.3	25.0
93	2	3.3	28.3
94	1	1.7	30.0
95	3	5.0	35.0
96	3	5.0	40.0
97	1	1.7	41.7
98	2	3.3	45.0
99	3	5.0	50.0
100	3	5.0	55.0
101	2	3.3	58.3
102	5	8.3	66.7
104	1	1.7	68.3
105	1	1.7	70.0
106	1	1.7	71.7
107	1	1.7	73.3
108	1	1.7	75.0
109	1	1.7	76.7
111	1	1.7	78.3
112	2	3.3	81.7
113	1	1.7	83.3
115	2	3.3	86.7
116	1	1.7	88.3
117	3	5.0	93.3
118	1	1.7	95.0
120	1	1.7	96.7
123	1	1.7	98.3
126	1	1.7	100.0

Table A4b

Frequency Tables for the WJ-III Brief Math Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
21	1	1.7	1.7
27	1	1.7	3.3
74	1	1.7	5.0
78	1	1.7	6.7
79	2	3.3	10.0
88	4	6.7	16.7
89	1	1.7	18.3
90	1	1.7	20.0
91	1	1.7	21.7
92	3	5.0	26.7
93	2	3.3	30.0
95	3	5.0	35.0
97	6	10.0	45.0
98	1	1.7	46.7
99	2	3.3	50.0
100	3	5.0	55.0
101	2	3.3	58.3
102	3	5.0	63.3
103	1	1.7	65.0
104	4	6.7	71.7
108	1	1.7	73.3
109	2	3.3	76.7
110	1	1.7	78.3
111	2	3.3	81.7
112	1	1.7	83.3
113	1	1.7	85.0
115	2	3.3	88.3
117	1	1.7	90.0
118	3	5.0	95.0
119	1	1.7	96.7
120	1	1.7	98.3
121	1	1.7	100.0

Table A4c

Frequency Tables for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
30	1	1.7	1.7
37	1	1.7	3.3
71	1	1.7	5.0
80	1	1.7	6.7
81	2	3.3	10.0
88	2	3.3	13.3
95	1	1.7	15.0
96	4	6.7	21.7
97	3	5.0	26.7
98	3	5.0	31.7
99	4	6.7	38.3
100	2	3.3	41.7
101	2	3.3	45.0
102	3	5.0	50.0
103	3	5.0	55.0
104	2	3.3	58.3
105	1	1.7	60.0
106	1	1.7	61.7
107	2	3.3	65.0
108	3	5.0	70.0
110	2	3.3	73.3
111	6	10.0	83.3
112	2	3.3	86.7
113	1	1.7	88.3
115	1	1.7	90.0
117	1	1.7	91.7
120	2	3.3	95.0
122	1	1.7	96.7
128	1	1.7	98.3
129	1	1.7	100.0

Table A4d

Frequency Tables for the WJ-III Calculation Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
35	1	1.7	1.7
43	1	1.7	3.3
74	1	1.7	5.0
84	3	5.0	10.0
89	2	3.3	13.3
93	3	5.0	18.3
97	7	11.7	30.0
102	18	30.0	60.0
108	8	13.3	73.3
113	7	11.7	85.0
118	5	8.3	93.3
123	3	5.0	98.3
128	1	1.7	100.0

Table A4e

Frequency Tables for the WJ-III Math Fluency Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
62	1	1.7	1.7
63	1	1.7	3.3
79	1	1.7	5.0
81	1	1.7	6.7
82	2	3.3	10.0
84	1	1.7	11.7
85	3	5.0	16.7
86	1	1.7	18.3
88	1	1.7	20.0
89	2	3.3	23.3
91	1	1.7	25.0
92	4	6.7	31.7
93	3	5.0	36.7
94	2	3.3	40.0
95	1	1.7	41.7
98	1	1.7	43.3
99	1	1.7	45.0
100	1	1.7	46.7
101	3	5.0	51.7
102	3	5.0	56.7
103	3	5.0	61.7
104	5	8.3	70.0
105	4	6.7	76.7
107	1	1.7	78.3
108	3	5.0	83.3
109	1	1.7	85.0
112	1	1.7	86.7
113	1	1.7	88.3
115	2	3.3	91.7
116	1	1.7	93.3
118	1	1.7	95.0
119	2	3.3	98.3
126	1	1.7	100.0

Table A4f

Frequency Tables for the WJ-III Math Reasoning Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
44	1	1.7	1.7
47	1	1.7	3.3
70	1	1.7	5.0
75	1	1.7	6.7
81	1	1.7	8.3
82	1	1.7	10.0
83	1	1.7	11.7
84	1	1.7	13.3
85	2	3.3	16.7
86	1	1.7	18.3
88	2	3.3	21.7
89	1	1.7	23.3
90	3	5.0	28.3
92	1	1.7	30.0
93	1	1.7	31.7
95	3	5.0	36.7
96	4	6.7	43.3
98	1	1.7	45.0
99	3	5.0	50.0
100	3	5.0	55.0
101	3	5.0	60.0
102	1	1.7	61.7
103	3	5.0	66.7
104	2	3.3	70.0
105	1	1.7	71.7
107	2	3.3	75.0
108	1	1.7	76.7
109	1	1.7	78.3
110	1	1.7	80.0
111	1	1.7	81.7
112	2	3.3	85.0
115	2	3.3	88.3
116	4	6.7	95.0
121	2	3.3	98.3
127	1	1.7	100.0

Table A4g

Frequency Tables for the WJ-III Applied Problems Grade-Based Standard Scores, Third Grade

Score	**Frequency**	**Percent**	**Cumulative Percent**
40	1	1.7	1.7
43	1	1.7	3.3
77	1	1.7	5.0
83	4	6.7	11.7
86	3	5.0	16.7
89	6	10.0	26.7
92	5	8.3	35.0
96	10	16.7	51.7
99	3	5.0	56.7
102	6	10.0	66.7
104	1	1.7	68.3
105	2	3.3	71.7
107	2	3.3	75.0
110	1	1.7	76.7
112	6	10.0	86.7
114	1	1.7	88.3
116	2	3.3	91.7
119	3	5.0	96.7
123	2	3.3	100.0

Tables A4h

Frequency Tables for the WJ-III Quantitative Concepts Grade-Based Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
57	1	1.7	1.7
61	1	1.7	3.3
63	1	1.7	5.0
68	1	1.7	6.7
74	1	1.7	8.3
80	1	1.7	10.0
81	1	1.7	11.7
82	1	1.7	13.3
84	1	1.7	15.0
85	1	1.7	16.7
88	1	1.7	18.3
90	1	1.7	20.0
91	3	5.0	25.0
92	1	1.7	26.7
93	2	3.3	30.0
94	1	1.7	31.7
95	1	1.7	33.3
97	2	3.3	36.7
98	3	5.0	41.7
100	3	5.0	46.7
101	4	6.7	53.3
102	1	1.7	55.0
103	1	1.7	56.7
106	5	8.3	65.0
107	3	5.0	70.0
108	1	1.7	71.7
109	1	1.7	73.3
110	4	6.7	80.0
111	3	5.0	85.0
112	2	3.3	88.3
115	3	5.0	93.3
119	1	1.7	95.0
121	1	1.7	96.7
123	1	1.7	98.3
128	1	1.7	100.0

Table A5a

Frequency Tables for the WJ-III Broad Math Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
75	1	1.5	1.5
78	2	2.9	4.4
79	1	1.5	5.9
80	1	1.5	7.4
82	1	1.5	8.8
85	2	2.9	11.8
86	1	1.5	13.2
88	4	5.9	19.1
89	2	2.9	22.1
90	2	2.9	25.0
91	1	1.5	26.5
92	3	4.4	30.9
93	1	1.5	32.4
94	2	2.9	35.3
95	2	2.9	38.2
96	5	7.4	45.6
97	2	2.9	48.5
98	2	2.9	51.5
99	1	1.5	52.9
100	4	5.9	58.8
101	1	1.5	60.3
102	3	4.4	64.7
103	3	4.4	69.1
104	4	5.9	75.0
105	2	2.9	77.9
106	1	1.5	79.4
110	1	1.5	80.9
111	3	4.4	85.3
112	2	2.9	88.2
113	1	1.5	89.7
114	1	1.5	91.2
115	1	1.5	92.6
116	2	2.9	95.6
118	3	4.4	100.0

Table A5b

Frequency Tables for the WJ-III Brief Math Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
71	1	1.5	1.5
77	1	1.5	2.9
78	2	2.9	5.9
79	1	1.5	7.4
80	1	1.5	8.8
83	1	1.5	10.3
85	2	2.9	13.2
87	3	4.4	17.6
89	3	4.4	22.1
91	3	4.4	26.5
92	3	4.4	30.9
93	3	4.4	35.3
95	6	8.8	44.1
96	1	1.5	45.6
97	4	5.9	51.5
98	1	1.5	52.9
99	6	8.8	61.8
100	4	5.9	67.6
101	1	1.5	69.1
102	2	2.9	72.1
103	2	2.9	75.0
104	1	1.5	76.5
105	2	2.9	79.4
106	2	2.9	82.4
108	1	1.5	83.8
109	2	2.9	86.8
110	1	1.5	88.2
113	2	2.9	91.2
114	1	1.5	92.6
115	1	1.5	94.1
116	2	2.9	97.1
117	2	2.9	100.0

Table A5c

Frequency Tables for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
77	1	1.5	1.5
84	2	2.9	4.4
86	1	1.5	5.9
87	2	2.9	8.8
88	2	2.9	11.8
89	4	5.9	17.6
90	1	1.5	19.1
92	2	2.9	22.1
93	5	7.4	29.4
94	2	2.9	32.4
95	2	2.9	35.3
96	2	2.9	38.2
97	1	1.5	39.7
98	2	2.9	42.6
99	3	4.4	47.1
100	2	2.9	50.0
101	3	4.4	54.4
102	2	2.9	57.4
103	3	4.4	61.8
104	2	2.9	64.7
106	3	4.4	69.1
107	1	1.5	70.6
108	2	2.9	73.5
109	2	2.9	76.5
110	3	4.4	80.9
111	2	2.9	83.8
113	2	2.9	86.8
114	2	2.9	89.7
115	1	1.5	91.2
116	1	1.5	92.6
117	1	1.5	94.1
120	2	2.9	97.1
121	1	1.5	98.5
124	1	1.5	100.0

Table A5d

Frequency Table for the WJ-III Calculation Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
80	1	1.5	1.5
85	1	1.5	2.9
89	6	8.8	11.8
93	14	20.6	32.4
97	7	10.3	42.6
101	13	19.1	61.8
105	18	26.5	88.2
109	4	5.9	94.1
114	2	2.9	97.1
118	1	1.5	98.5
122	1	1.5	100.0

Table A5e

Frequency Table for the WJ-III Math Fluency Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
75	1	1.5	1.5
77	1	1.5	2.9
78	1	1.5	4.4
81	1	1.5	5.9
82	1	1.5	7.4
83	1	1.5	8.8
85	1	1.5	10.3
86	2	2.9	13.2
87	1	1.5	14.7
88	1	1.5	16.2
89	2	2.9	19.1
90	3	4.4	23.5
92	2	2.9	26.5
93	1	1.5	27.9
94	4	5.9	33.8
95	3	4.4	38.2
96	4	5.9	44.1
98	4	5.9	50.0
101	2	2.9	52.9
102	1	1.5	54.4
103	1	1.5	55.9
104	3	4.4	60.3
105	1	1.5	61.8
106	3	4.4	66.2
108	1	1.5	67.6
111	2	2.9	70.6
112	3	4.4	75.0
113	2	2.9	77.9
114	1	1.5	79.4
116	2	2.9	82.4
117	1	1.5	83.8
118	1	1.5	85.3
120	2	2.9	88.2
121	2	2.9	91.2
122	1	1.5	92.6
123	1	1.5	94.1
129	1	1.5	95.6
130	1	1.5	97.1
137	1	1.5	98.5
151	1	1.5	100.0

Table A5f

Frequency Tables for the WJ-III Math Reasoning Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
78	1	1.5	1.5
80	1	1.5	2.9
81	1	1.5	4.4
82	1	1.5	5.9
83	1	1.5	7.4
86	3	4.4	11.8
87	1	1.5	13.2
89	2	2.9	16.2
90	1	1.5	17.6
91	2	2.9	20.6
92	5	7.4	27.9
93	3	4.4	32.4
94	5	7.4	39.7
95	4	5.9	45.6
96	4	5.9	51.5
97	4	5.9	57.4
99	3	4.4	61.8
100	1	1.5	63.2
102	1	1.5	64.7
103	2	2.9	67.6
104	1	1.5	69.1
105	3	4.4	73.5
106	2	2.9	76.5
107	2	2.9	79.4
108	2	2.9	82.4
109	2	2.9	85.3
110	2	2.9	88.2
111	1	1.5	89.7
113	1	1.5	91.2
114	2	2.9	94.1
116	2	2.9	97.1
120	1	1.5	98.5
121	1	1.5	100.0

Table A5g

Frequency Table for the WJ-III Applied Problems Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
69	1	1.5	1.5
72	1	1.5	2.9
78	2	2.9	5.9
81	1	1.5	7.4
84	3	4.4	11.8
87	9	13.2	25.0
90	7	10.3	35.3
93	5	7.4	42.6
96	9	13.2	55.9
98	4	5.9	61.8
100	2	2.9	64.7
102	2	2.9	67.6
104	4	5.9	73.5
106	5	7.4	80.9
109	3	4.4	85.3
111	2	2.9	88.2
113	3	4.4	92.6
115	2	2.9	95.6
117	2	2.9	98.5
123	1	1.5	100.0

Table A5h

Frequency Table for the WJ-III Quantitative Concepts Grade-Based Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
79	1	1.5	1.5
80	1	1.5	2.9
81	2	2.9	5.9
84	1	1.5	7.4
89	1	1.5	8.8
90	2	2.9	11.8
91	3	4.4	16.2
92	1	1.5	17.6
93	1	1.5	19.1
94	6	8.8	27.9
95	2	2.9	30.9
96	1	1.5	32.4
97	5	7.4	39.7
98	4	5.9	45.6
99	2	2.9	48.5
100	4	5.9	54.4
101	2	2.9	57.4
103	1	1.5	58.8
104	6	8.8	67.6
105	5	7.4	75.0
106	1	1.5	76.5
108	3	4.4	80.9
109	5	7.4	88.2
110	1	1.5	89.7
112	3	4.4	94.1
114	1	1.5	95.6
116	1	1.5	97.1
120	1	1.5	98.5
122	1	1.5	100.0

Table A6a

Frequency Table for the WJ-III Broad Math Grade-Based Standard Scores, Fifth Grade

Score	**Frequency**	**Percent**	**Cumulative Percent**
23	1	2.1	2.1
83	1	2.1	4.2
85	2	4.2	8.3
86	2	4.2	12.5
87	1	2.1	14.6
89	2	4.2	18.8
90	2	4.2	22.9
91	3	6.2	29.2
92	1	2.1	31.2
93	2	4.2	35.4
94	2	4.2	39.6
97	4	8.3	47.9
98	2	4.2	52.1
99	2	4.2	56.2
100	1	2.1	58.3
103	1	2.1	60.4
104	1	2.1	62.5
105	2	4.2	66.7
107	2	4.2	70.8
109	1	2.1	72.9
111	1	2.1	75.0
112	1	2.1	77.1
113	1	2.1	79.1
114	1	2.1	81.2
115	2	4.2	85.4
117	2	4.2	89.6
120	1	2.1	91.7
121	1	2.1	93.8
122	1	2.1	95.8
123	1	2.1	97.9
125	1	2.1	100.0

Table A6b

Frequency Table for the WJ-III Brief Math Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
20	1	2.1	2.1
83	1	2.1	4.2
85	4	8.3	12.5
86	1	2.1	14.6
87	1	2.1	16.7
88	4	8.3	25.0
90	1	2.1	27.1
91	2	4.2	31.2
93	3	6.2	37.5
95	2	4.2	41.7
97	2	4.2	45.8
98	1	2.1	47.9
99	2	4.2	52.1
100	1	2.1	54.2
102	2	4.2	58.3
103	1	2.1	60.4
104	2	4.2	64.6
105	1	2.1	66.7
106	1	2.1	68.8
108	1	2.1	70.8
109	1	2.1	72.9
110	1	2.1	75.0
111	1	2.1	77.1
112	2	4.2	81.2
114	1	2.1	83.3
115	2	4.2	87.5
116	1	2.1	89.6
118	1	2.1	91.7
119	3	6.2	97.9
124	1	2.1	100.0

Table A6c

Frequency Table for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
12	1	2.1	2.1
83	1	2.1	4.2
84	1	2.1	6.2
85	2	4.2	10.4
86	1	2.1	12.5
87	1	2.1	14.6
88	2	4.2	18.8
89	4	8.3	27.1
90	2	4.2	31.2
91	1	2.1	33.3
92	2	4.2	37.5
93	1	2.1	39.6
94	2	4.2	43.8
97	2	4.2	47.9
98	1	2.1	50.0
101	2	4.2	54.2
102	2	4.2	58.3
103	2	4.2	62.5
106	2	4.2	66.7
107	1	2.1	68.8
108	2	4.2	72.9
109	1	2.1	75.0
110	1	2.1	77.1
111	1	2.1	79.2
112	1	2.1	81.2
113	1	2.1	83.3
114	1	2.1	85.6
115	3	6.2	91.7
117	2	4.2	95.8
119	1	2.1	97.9
127	1	2.1	100.0

Table A6d

Frequency Table for the WJ-III Calculation Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
8	1	2.1	2.1
79	1	2.1	4.2
83	3	6.2	10.4
87	5	10.4	20.8
91	6	12.5	33.3
94	4	8.3	41.7
98	3	6.2	47.9
102	8	16.7	64.6
106	2	4.2	68.8
110	8	16.7	85.4
114	6	12.5	97.9
121	1	2.1	100.0

Table A6e

Frequency Table for the WJ-III Math Fluency Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
55	1	2.1	2.1
80	1	2.1	4.2
85	1	2.1	6.2
86	2	4.2	10.4
88	2	4.2	14.6
90	1	2.1	16.7
92	1	2.1	18.8
93	1	2.1	20.8
94	2	4.2	25.0
96	4	8.3	33.3
97	1	2.1	35.4
98	3	6.2	41.7
99	2	4.2	45.8
100	2	4.2	50.0
101	3	6.2	56.2
103	3	6.2	62.5
104	2	4.2	66.7
105	4	8.3	75.0
106	1	2.1	77.1
111	1	2.1	79.2
115	2	4.2	83.3
117	1	2.1	85.4
118	2	4.2	89.6
119	2	4.2	93.8
122	1	2.1	95.8
126	1	2.1	97.9
139	1	2.1	100.0

Table A6f

Frequency Table for the WJ-III Math Reasoning Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
44	1	2.1	2.1
81	2	4.2	6.2
84	1	2.1	8.3
88	1	2.1	10.4
89	1	2.1	12.5
90	2	4.2	16.7
91	3	6.2	22.9
93	2	4.2	27.1
94	2	4.2	31.2
95	4	8.3	39.6
96	1	2.1	41.7
97	1	2.1	43.8
99	1	2.1	45.8
101	5	10.4	56.2
102	1	2.1	58.3
103	2	4.2	62.5
105	3	6.2	68.8
106	2	4.2	72.9
108	1	2.1	75.0
109	3	6.2	81.2
110	2	4.2	85.4
113	1	2.1	87.5
114	2	4.2	91.7
119	1	2.1	93.8
120	1	2.1	95.8
121	1	2.1	97.9
130	1	2.1	100.0

Table A6g

Frequency Table for the WJ-III Applied Problems Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
49	1	2.1	2.1
79	1	2.1	4.2
85	2	4.2	8.3
88	4	8.3	16.7
90	5	10.4	27.1
92	3	6.2	33.3
94	2	4.2	37.5
98	5	10.4	47.9
102	3	6.2	54.2
104	4	8.3	62.5
106	4	8.3	70.8
108	3	6.2	77.1
110	2	4.2	81.2
112	2	4.2	85.4
114	1	2.1	87.5
116	2	4.2	91.7
120	3	6.2	97.9
123	1	2.1	100.0

Table A6h

Frequency Table for the WJ-III Quantitative Concepts Grade-Based Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
44	1	2.1	2.1
77	1	2.1	4.2
82	1	2.1	6.2
86	2	4.2	10.4
87	1	2.1	12.5
90	1	2.1	14.6
91	2	4.2	18.8
93	1	2.1	20.8
94	5	10.4	31.2
96	1	2.1	33.3
97	9	18.8	52.1
99	1	2.1	54.2
100	3	6.2	60.4
101	1	2.1	62.5
102	1	2.1	64.6
103	3	6.2	70.8
104	3	6.2	77.1
106	1	2.1	79.2
107	1	2.1	81.2
110	2	4.2	85.4
111	1	2.1	87.5
112	1	2.1	89.6
114	2	4.2	93.8
115	1	2.1	95.8
119	1	2.1	97.9
133	1	2.1	100.0

Table A7a

Frequency Table for the SMALSI Study Strategies Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
20	1	.6	.6
24	1	.6	1.1
30	5	2.8	4.0
32	5	2.8	6.8
33	3	1.7	8.5
34	4	2.3	10.8
36	5	2.8	13.6
37	3	1.7	15.3
38	1	.6	15.9
39	8	4.5	20.5
40	5	2.8	23.3
41	10	5.7	29.0
43	10	5.7	34.7
44	8	4.5	39.2
46	4	2.3	41.5
47	13	7.4	48.9
49	8	4.5	53.4
50	7	4.0	57.4
52	7	4.0	61.4
53	7	4.0	65.3
55	8	4.5	69.9
56	12	6.8	76.7
58	8	4.5	81.2
59	5	2.8	84.1
60	5	2.8	86.9
62	9	5.1	92.0
63	2	1.1	93.2
65	3	1.7	94.9
66	2	1.1	96.0
68	3	1.7	97.7
70	2	1.1	98.9
72	1	.6	99.4
75	1	.6	100.0

Table A7b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
25	3	1.7	1.7
28	2	1.1	2.8
30	3	1.7	4.5
32	1	.6	5.1
33	7	4.0	9.1
34	8	4.5	13.6
35	5	2.8	16.5
36	3	1.7	18.2
37	1	.6	18.8
38	6	3.4	22.2
39	3	1.7	23.9
41	6	3.4	27.3
42	7	4.0	31.2
43	11	6.2	37.5
44	4	2.3	39.8
46	6	3.4	43.2
47	5	2.8	46.0
48	5	2.8	48.9
49	5	2.8	51.7
51	7	4.0	55.7
52	8	4.5	60.2
53	10	5.7	65.9
54	8	4.5	70.5
55	6	3.4	73.9
57	12	6.8	80.7
58	4	2.3	83.0
59	7	4.0	86.9
60	3	1.7	88.6
61	5	2.8	91.5
62	2	1.1	92.6
63	4	2.3	94.9
65	2	1.1	96.0
66	2	1.1	97.2
67	1	.6	97.7
69	2	1.1	98.9
74	1	.6	99.4
75	1	.6	100.0

Table A7c

Frequency Table for the SMALSI Reading/Comprehension Strategies Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
24	1	.6	.6
26	2	1.1	1.7
27	2	1.1	2.8
29	2	1.1	4.0
31	4	2.3	6.2
32	2	1.1	7.4
33	2	1.1	8.5
35	5	2.8	11.4
36	5	2.8	14.2
38	2	1.1	15.3
39	5	2.8	18.2
41	8	4.5	22.7
42	6	3.4	26.1
44	9	5.1	31.2
45	8	4.5	35.8
47	11	6.2	42.0
48	10	5.7	47.7
49	11	6.2	54.0
51	8	4.5	58.5
52	5	2.8	61.4
53	13	7.4	68.8
54	3	1.7	70.5
55	4	2.3	72.7
57	6	3.4	76.1
58	5	2.8	79.0
59	7	4.0	83.0
60	10	5.7	88.6
62	6	3.4	92.0
63	1	.6	92.6
65	2	1.1	93.8
67	2	1.1	94.9
70	3	1.7	96.6
71	1	.6	97.2
72	2	1.1	98.3
73	1	.6	98.9
74	1	.6	99.4
76	1	.6	100.0

Table A7d

Frequency Table for the SMALSI Writing/Research Skills Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
22	1	.6	.6
24	1	.6	1.1
25	1	.6	1.7
29	2	1.1	2.8
31	4	2.3	5.1
32	3	1.7	6.8
34	5	2.8	9.7
36	3	1.7	11.4
38	5	2.8	14.2
40	6	3.4	17.6
42	7	4.0	21.6
44	11	6.2	27.8
45	15	8.5	36.4
47	9	5.1	41.5
50	12	6.8	48.3
52	11	6.2	54.5
53	10	5.7	60.2
55	11	6.2	66.5
57	10	5.7	72.2
59	10	5.7	77.8
61	9	5.1	83.0
63	6	3.4	86.4
65	4	2.3	88.6
67	7	4.0	92.6
69	4	2.3	94.9
73	1	.6	95.5
75	5	2.8	98.3
80	3	1.7	100.0

Table A7e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
25	1	.6	.6
28	1	.6	1.1
29	3	1.7	2.8
30	2	1.1	4.0
32	2	1.1	5.1
33	2	1.1	6.2
34	4	2.3	8.5
36	6	3.4	11.9
37	6	3.4	15.3
39	4	2.3	17.6
40	6	3.4	21.0
42	8	4.5	25.6
44	7	4.0	29.5
45	8	4.5	34.1
47	4	2.3	36.4
48	10	5.7	42.0
50	9	5.1	47.2
51	10	5.7	52.8
53	11	6.2	59.1
54	11	6.2	65.3
56	7	4.0	69.3
58	5	2.8	72.2
59	8	4.5	76.7
61	7	4.0	80.7
63	8	4.5	85.2
65	7	4.0	89.2
66	8	4.5	93.8
68	1	.6	94.3
71	6	3.4	97.7
73	3	1.7	99.4
77	1	.6	100.0

Table A7f

Frequency Table for the SMALSI Time Management/Organizational Techniques Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
25	1	.6	.6
27	1	.6	1.1
28	2	1.1	2.3
29	4	2.3	4.5
30	4	2.3	6.8
31	1	.6	7.4
34	1	.6	8.0
35	4	2.3	10.2
36	5	2.8	13.1
38	6	3.4	16.5
39	9	5.1	21.6
41	5	2.8	24.4
42	6	3.4	27.8
43	10	5.7	33.5
44	10	5.7	39.2
46	7	4.0	43.2
47	15	8.5	51.7
48	9	5.1	56.8
49	7	4.0	60.8
50	7	4.0	64.8
51	8	4.5	69.3
53	6	3.4	72.7
54	5	2.8	75.6
55	7	4.0	79.5
56	7	4.0	83.5
57	3	1.7	85.2
58	3	1.7	86.9
59	5	2.8	89.8
61	6	3.4	93.2
62	1	.6	93.8
63	1	.6	94.3
64	1	.6	94.9
65	1	.6	95.5
66	2	1.1	96.6
67	1	.6	97.2
69	1	.6	97.7
70	1	.6	98.3
71	1	.6	98.9
76	1	.6	99.4
80	1	.6	100.0

Table A7g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Full Sample

Score	**Frequency**	**Percent**	**Cumulative Percent**
27	6	3.4	3.4
32	7	4.0	7.4
35	8	4.5	11.9
37	5	2.8	14.8
39	7	4.0	18.8
41	9	5.1	23.9
43	9	5.1	29.0
44	5	2.8	31.8
45	8	4.5	36.4
46	6	3.4	39.8
48	8	4.5	44.3
49	9	5.1	49.4
50	1	.6	50.0
51	4	2.3	52.3
52	6	3.4	55.7
53	5	2.8	58.5
54	3	1.7	60.2
55	4	2.3	62.5
56	5	2.8	65.3
57	6	3.4	68.8
58	3	1.7	70.5
59	5	2.8	73.3
60	6	3.4	76.7
61	8	4.5	81.2
63	3	1.7	83.0
64	4	2.3	85.2
65	2	1.1	86.4
66	5	2.8	89.2
67	3	1.7	90.9
68	2	1.1	92.0
69	3	1.7	93.8
70	4	2.3	96.0
71	1	.6	96.6
72	2	1.1	97.7
73	1	.6	98.3
74	2	1.1	99.4
78	1	.6	100.0

Table A7h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
27	1	.6	.6
29	2	1.1	1.7
33	2	1.1	2.8
35	1	.6	3.4
36	4	2.3	5.7
38	6	3.4	9.1
39	9	5.1	14.2
40	4	2.3	16.5
41	9	5.1	21.6
42	3	1.7	23.3
43	3	1.7	25.0
44	4	2.3	27.3
45	9	5.1	32.4
46	5	2.8	35.2
47	3	1.7	36.9
48	15	8.5	45.5
49	6	3.4	48.9
50	4	2.3	51.1
51	5	2.8	54.0
52	4	2.3	56.2
53	5	2.8	59.1
54	5	2.8	61.9
55	5	2.8	64.8
56	6	3.4	68.2
57	13	7.4	75.6
58	3	1.7	77.3
59	3	1.7	79.0
60	6	3.4	82.4
61	1	.6	83.0
62	5	2.8	85.8
63	2	1.1	86.9
64	3	1.7	88.6
65	5	2.8	91.5
66	3	1.7	93.2
67	2	1.1	94.3
69	3	1.7	96.0
70	1	.6	96.6
71	1	.6	97.2
75	1	.6	97.7
77	3	1.7	99.4
80	1	.6	100.0

Table A7i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Full Sample

Score	Frequency	Percent	Cumulative Percent
20	1	.6	.6
25	3	1.7	2.3
28	5	2.8	5.1
31	3	1.7	6.8
33	9	5.1	11.9
36	4	2.3	14.2
38	5	2.8	17.0
39	5	2.8	19.9
41	7	4.0	23.9
42	9	5.1	29.0
43	10	5.7	34.7
44	6	3.4	38.1
45	3	1.7	39.8
47	7	4.0	43.8
48	6	3.4	47.2
49	5	2.8	50.0
50	9	5.1	55.1
51	7	4.0	59.1
53	5	2.8	61.9
54	7	4.0	65.9
55	4	2.3	68.2
56	7	4.0	72.2
57	6	3.4	75.6
58	2	1.1	76.7
59	3	1.7	78.4
60	5	2.8	81.2
62	5	2.8	84.1
64	3	1.7	85.8
65	2	1.1	86.9
66	1	.6	87.5
69	2	1.1	88.6
70	3	1.7	90.3
71	3	1.7	92.0
72	3	1.7	93.8
73	1	.6	94.3
74	2	1.1	95.5
75	4	2.3	97.7
76	2	1.1	98.9
77	2	1.1	100.0

Table A8a

Frequency Table for the SMALSI Study Strategies Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
24	1	1.1	1.1
30	4	4.5	5.6
33	2	2.2	7.9
34	1	1.1	9.0
36	2	2.2	11.2
37	2	2.2	13.5
39	1	1.1	14.6
41	5	5.6	20.2
43	3	3.4	23.6
44	5	5.6	29.2
46	2	2.2	31.5
47	6	6.7	38.2
49	4	4.5	42.7
50	5	5.6	48.3
52	6	6.7	55.1
53	2	2.2	57.3
55	6	6.7	64.0
56	5	5.6	69.7
58	4	4.5	74.2
59	4	4.5	78.7
60	5	5.6	84.3
62	5	5.6	89.9
63	1	1.1	91.0
65	2	2.2	93.3
68	2	2.2	95.5
70	2	2.2	97.8
72	1	1.1	98.9
75	1	1.1	100.0

Table A8b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
30	2	2.2	2.2
33	2	2.2	4.5
34	4	4.5	9.0
35	2	2.2	11.2
36	1	1.1	12.4
37	1	1.1	13.5
38	4	4.5	18.0
39	2	2.2	20.2
41	1	1.1	21.3
42	2	2.2	23.6
43	1	1.1	24.7
44	2	2.2	27.0
46	3	3.4	30.3
47	2	2.2	32.6
48	4	4.5	37.1
49	4	4.5	41.6
51	5	5.6	47.2
52	5	5.6	52.8
53	6	6.7	59.6
54	7	7.9	67.4
55	3	3.4	70.8
57	5	5.6	76.4
58	3	3.4	79.8
59	3	3.4	83.1
60	3	3.4	86.5
61	1	1.1	87.6
62	2	2.2	89.9
63	3	3.4	93.3
65	2	2.2	95.5
67	1	1.1	96.6
69	1	1.1	97.8
74	1	1.1	98.9
75	1	1.1	100.0

Table A8c
Frequency Tables for the SMALSI Reading/Comprehension Strategies Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
26	2	2.2	2.2
31	2	2.2	4.5
35	3	3.4	7.9
36	3	3.4	11.2
39	1	1.1	12.4
41	3	3.4	15.7
42	3	3.4	19.1
44	5	5.6	24.7
45	1	1.1	25.8
47	3	3.4	29.2
48	6	6.7	36.0
49	6	6.7	42.7
51	4	4.5	47.2
52	3	3.4	50.6
53	7	7.9	58.4
54	2	2.2	60.7
55	4	4.5	65.2
57	4	4.5	69.7
58	3	3.4	73.0
59	3	3.4	76.4
60	5	5.6	82.0
62	2	2.2	84.3
63	1	1.1	85.4
65	2	2.2	87.6
67	2	2.2	89.9
70	3	3.4	93.3
71	1	1.1	94.4
72	2	2.2	96.6
73	1	1.1	97.8
74	1	1.1	98.9
76	1	1.1	100.0

Table A8d

Frequency Tables for the SMALSI Writing/Research Skills Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
22	1	1.1	1.1
31	1	1.1	2.2
32	1	1.1	3.4
34	2	2.2	5.6
36	2	2.2	7.9
38	4	4.5	12.4
40	4	4.5	16.9
42	3	3.4	20.2
44	5	5.6	25.8
45	5	5.6	31.5
47	6	6.7	38.2
50	3	3.4	41.6
52	3	3.4	44.9
53	5	5.6	50.6
55	7	7.9	58.4
57	5	5.6	64.0
59	5	5.6	69.7
61	7	7.9	77.5
63	2	2.2	79.8
65	4	4.5	84.3
67	3	3.4	87.6
69	3	3.4	91.0
73	1	1.1	92.1
75	4	4.5	96.6
80	3	3.4	100.0

Table A8e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
29	2	2.2	2.2
36	4	4.5	6.7
37	4	4.5	11.2
39	1	1.1	12.4
40	2	2.2	14.6
42	2	2.2	16.9
44	4	4.5	21.3
45	3	3.4	24.7
47	1	1.1	25.8
48	5	5.6	31.5
50	5	5.6	37.1
51	6	6.7	43.8
53	6	6.7	50.6
54	5	5.6	56.2
56	4	4.5	60.7
58	4	4.5	65.2
59	5	5.6	70.8
61	5	5.6	76.4
63	5	5.6	82.0
65	2	2.2	84.3
66	6	6.7	91.0
68	1	1.1	92.1
71	4	4.5	96.6
73	2	2.2	98.9
77	1	1.1	100.0

Table A8f

Frequency Tables for the SMALSI Time Management/Organizational Techniques Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
28	2	2.2	2.2
29	1	1.1	3.4
30	2	2.2	5.6
35	2	2.2	7.9
36	2	2.2	10.1
38	4	4.5	14.6
39	3	3.4	18.0
41	4	4.5	22.5
42	1	1.1	23.6
43	4	4.5	28.1
44	3	3.4	31.5
46	3	3.4	34.8
47	6	6.7	41.6
48	4	4.5	46.1
49	4	4.5	50.6
50	1	1.1	51.7
51	4	4.5	56.2
53	5	5.6	61.8
54	4	4.5	66.3
55	5	5.6	71.9
56	3	3.4	75.3
57	2	2.2	77.5
58	3	3.4	80.9
59	3	3.4	84.3
61	3	3.4	87.6
62	1	1.1	88.8
63	1	1.1	89.9
64	1	1.1	91.0
65	1	1.1	92.1
66	2	2.2	94.4
69	1	1.1	95.5
70	1	1.1	96.6
71	1	1.1	97.8
76	1	1.1	98.9
80	1	1.1	100.0

Table A8g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
27	2	2.2	2.2
32	3	3.4	5.6
35	6	6.7	12.4
37	3	3.4	15.7
39	2	2.2	18.0
41	5	5.6	23.6
43	4	4.5	28.1
44	4	4.5	32.6
45	5	5.6	38.2
46	1	1.1	39.3
48	7	7.9	47.2
49	5	5.6	52.8
51	2	2.2	55.1
53	2	2.2	57.3
54	3	3.4	60.7
56	2	2.2	62.9
57	3	3.4	66.3
58	1	1.1	67.4
59	3	3.4	70.8
60	5	5.6	76.4
61	4	4.5	80.9
63	2	2.2	83.1
64	2	2.2	85.4
65	1	1.1	86.5
66	3	3.4	89.9
67	2	2.2	92.1
68	1	1.1	93.3
69	1	1.1	94.4
70	2	2.2	96.6
72	2	2.2	98.9
78	1	1.1	100.0

Table A8h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
27	1	1.1	1.1
29	1	1.1	2.2
33	1	1.1	3.4
36	1	1.1	4.5
38	2	2.2	6.7
39	5	5.6	12.4
40	2	2.2	14.6
41	2	2.2	16.9
42	3	3.4	20.2
43	1	1.1	21.3
44	2	2.2	23.6
45	3	3.4	27.0
46	3	3.4	30.3
47	2	2.2	32.6
48	6	6.7	39.3
49	3	3.4	42.7
50	2	2.2	44.9
51	2	2.2	47.2
52	2	2.2	49.4
53	1	1.1	50.6
54	2	2.2	52.8
55	4	4.5	57.3
56	2	2.2	59.6
57	8	9.0	68.5
58	1	1.1	69.7
59	3	3.4	73.0
60	5	5.6	78.7
61	1	1.1	79.8
62	3	3.4	83.1
63	1	1.1	84.3
64	3	3.4	87.6
65	1	1.1	88.8
66	2	2.2	91.0
67	2	2.2	93.3
69	3	3.4	96.6
71	1	1.1	97.8
75	1	1.1	98.9
80	1	1.1	100.0

Table A8i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Female Participants

Score	Frequency	Percent	Cumulative Percent
20	1	1.1	1.1
25	2	2.2	3.4
28	2	2.2	5.6
31	2	2.2	7.9
33	4	4.5	12.4
36	2	2.2	14.6
38	4	4.5	19.1
39	4	4.5	23.6
41	5	5.6	29.2
42	6	6.7	36.0
43	5	5.6	41.6
44	2	2.2	43.8
45	1	1.1	44.9
47	3	3.4	48.3
48	1	1.1	49.4
49	2	2.2	51.7
50	5	5.6	57.3
51	4	4.5	61.8
53	2	2.2	64.0
54	3	3.4	67.4
55	2	2.2	69.7
56	6	6.7	76.4
57	3	3.4	79.8
58	1	1.1	80.9
59	1	1.1	82.0
60	2	2.2	84.3
62	2	2.2	86.5
64	3	3.4	89.9
69	1	1.1	91.0
72	2	2.2	93.3
74	2	2.2	95.5
75	2	2.2	97.8
76	1	1.1	98.9
77	1	1.1	100.0

Table A9a

Frequency Table for the SMALSI Study Strategies Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
20	1	1.1	1.1
30	1	1.1	2.3
32	5	5.7	8.0
33	1	1.1	9.2
34	3	3.4	12.6
36	3	3.4	16.1
37	1	1.1	17.2
38	1	1.1	18.4
39	7	8.0	26.4
40	5	5.7	32.2
41	5	5.7	37.9
43	7	8.0	46.0
44	3	3.4	49.4
46	2	2.3	51.7
47	7	8.0	59.8
49	4	4.6	64.4
50	2	2.3	66.7
52	1	1.1	67.8
53	5	5.7	73.6
55	2	2.3	75.9
56	7	8.0	83.9
58	4	4.6	88.5
59	1	1.1	89.7
62	4	4.6	94.3
63	1	1.1	95.4
65	1	1.1	96.6
66	2	2.3	98.9
68	1	1.1	100.0

Table A9b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
25	3	3.4	3.4
28	2	2.3	5.7
30	1	1.1	6.9
32	1	1.1	8.0
33	5	5.7	13.8
34	4	4.6	18.4
35	3	3.4	21.8
36	2	2.3	24.1
38	2	2.3	26.4
39	1	1.1	27.6
41	5	5.7	33.3
42	5	5.7	39.1
43	10	11.5	50.6
44	2	2.3	52.9
46	3	3.4	56.3
47	3	3.4	59.8
48	1	1.1	60.9
49	1	1.1	62.1
51	2	2.3	64.4
52	3	3.4	67.8
53	4	4.6	72.4
54	1	1.1	73.6
55	3	3.4	77.0
57	7	8.0	85.1
58	1	1.1	86.2
59	4	4.6	90.8
61	4	4.6	95.4
63	1	1.1	96.6
66	2	2.3	98.9
69	1	1.1	100.0

Table A9c

Frequency Table for the SMALSI Reading/Comprehension Strategies Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
24	1	1.1	1.1
27	2	2.3	3.4
29	2	2.3	5.7
31	2	2.3	8.0
32	2	2.3	10.3
33	2	2.3	12.6
35	2	2.3	14.9
36	2	2.3	17.2
38	2	2.3	19.5
39	4	4.6	24.1
41	5	5.7	29.9
42	3	3.4	33.3
44	4	4.6	37.9
45	7	8.0	46.0
47	8	9.2	55.2
48	4	4.6	59.8
49	5	5.7	65.5
51	4	4.6	70.1
52	2	2.3	72.4
53	6	6.9	79.3
54	1	1.1	80.5
57	2	2.3	82.8
58	2	2.3	85.1
59	4	4.6	89.7
60	5	5.7	95.4
62	4	4.6	100.0

Table A9d

Frequency Table for the SMALSI Writing/Research Skills Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
24	1	1.1	1.1
25	1	1.1	2.3
29	2	2.3	4.6
31	3	3.4	8.0
32	2	2.3	10.3
34	3	3.4	13.8
36	1	1.1	14.9
38	1	1.1	16.1
40	2	2.3	18.4
42	4	4.6	23.0
44	6	6.9	29.9
45	10	11.5	41.4
47	3	3.4	44.8
50	9	10.3	55.2
52	8	9.2	64.4
53	5	5.7	70.1
55	4	4.6	74.7
57	5	5.7	80.5
59	5	5.7	86.2
61	2	2.3	88.5
63	4	4.6	93.1
67	4	4.6	97.7
69	1	1.1	98.9
75	1	1.1	100.0

Table A9e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
25	1	1.1	1.1
28	1	1.1	2.3
29	1	1.1	3.4
30	2	2.3	5.7
32	2	2.3	8.0
33	2	2.3	10.3
34	4	4.6	14.9
36	2	2.3	17.2
37	2	2.3	19.5
39	3	3.4	23.0
40	4	4.6	27.6
42	6	6.9	34.5
44	3	3.4	37.9
45	5	5.7	43.7
47	3	3.4	47.1
48	5	5.7	52.9
50	4	4.6	57.5
51	4	4.6	62.1
53	5	5.7	67.8
54	6	6.9	74.7
56	3	3.4	78.2
58	1	1.1	79.3
59	3	3.4	82.8
61	2	2.3	85.1
63	3	3.4	88.5
65	5	5.7	94.3
66	2	2.3	96.6
71	2	2.3	98.9
73	1	1.1	100.0

Table A9f
Frequency Table for the SMALSI Time Management/Organizational Techniques Standard Scores, Male Participants

Score	**Frequency**	**Percent**	**Cumulative Percent**
25	1	1.1	1.1
27	1	1.1	2.3
29	3	3.4	5.7
30	2	2.3	8.0
31	1	1.1	9.2
34	1	1.1	10.3
35	2	2.3	12.6
36	3	3.4	16.1
38	2	2.3	18.4
39	6	6.9	25.3
41	1	1.1	26.4
42	5	5.7	32.2
43	6	6.9	39.1
44	7	8.0	47.1
46	4	4.6	51.7
47	9	10.3	62.1
48	5	5.7	67.8
49	3	3.4	71.3
50	6	6.9	78.2
51	4	4.6	82.8
53	1	1.1	83.9
54	1	1.1	85.1
55	2	2.3	87.4
56	4	4.6	92.0
57	1	1.1	93.1
59	2	2.3	95.4
61	3	3.4	98.9
67	1	1.1	100.0

Table A9g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
27	4	4.6	4.6
32	4	4.6	9.2
35	2	2.3	11.5
37	2	2.3	13.8
39	5	5.7	19.5
41	4	4.6	24.1
43	5	5.7	29.9
44	1	1.1	31.0
45	3	3.4	34.5
46	5	5.7	40.2
48	1	1.1	41.4
49	4	4.6	46.0
50	1	1.1	47.1
51	2	2.3	49.4
52	6	6.9	56.3
53	3	3.4	59.8
55	4	4.6	64.4
56	3	3.4	67.8
57	3	3.4	71.3
58	2	2.3	73.6
59	2	2.3	75.9
60	1	1.1	77.0
61	4	4.6	81.6
63	1	1.1	82.8
64	2	2.3	85.1
65	1	1.1	86.2
66	2	2.3	88.5
67	1	1.1	89.7
68	1	1.1	90.8
69	2	2.3	93.1
70	2	2.3	95.4
71	1	1.1	96.6
73	1	1.1	97.7
74	2	2.3	100.0

Table A9h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
29	1	1.1	1.1
33	1	1.1	2.3
35	1	1.1	3.4
36	3	3.4	6.9
38	4	4.6	11.5
39	4	4.6	16.1
40	2	2.3	18.4
41	7	8.0	26.4
43	2	2.3	28.7
44	2	2.3	31.0
45	6	6.9	37.9
46	2	2.3	40.2
47	1	1.1	41.4
48	9	10.3	51.7
49	3	3.4	55.2
50	2	2.3	57.5
51	3	3.4	60.9
52	2	2.3	63.2
53	4	4.6	67.8
54	3	3.4	71.3
55	1	1.1	72.4
56	4	4.6	77.0
57	5	5.7	82.8
58	2	2.3	85.1
60	1	1.1	86.2
62	2	2.3	88.5
63	1	1.1	89.7
65	4	4.6	94.3
66	1	1.1	95.4
70	1	1.1	96.6
77	3	3.4	100.0

Table A9i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Male Participants

Score	Frequency	Percent	Cumulative Percent
25	1	1.1	1.1
28	3	3.4	4.6
31	1	1.1	5.7
33	5	5.7	11.5
36	2	2.3	13.8
38	1	1.1	14.9
39	1	1.1	16.1
41	2	2.3	18.4
42	3	3.4	21.8
43	5	5.7	27.6
44	4	4.6	32.2
45	2	2.3	34.5
47	4	4.6	39.1
48	5	5.7	44.8
49	3	3.4	48.3
50	4	4.6	52.9
51	3	3.4	56.3
53	3	3.4	59.8
54	4	4.6	64.4
55	2	2.3	66.7
56	1	1.1	67.8
57	3	3.4	71.3
58	1	1.1	72.4
59	2	2.3	74.7
60	3	3.4	78.2
62	3	3.4	81.6
65	2	2.3	83.9
66	1	1.1	85.1
69	1	1.1	86.2
70	3	3.4	89.7
71	3	3.4	93.1
72	1	1.1	94.3
73	1	1.1	95.4
75	2	2.3	97.7
76	1	1.1	98.9
77	1	1.1	100.0

Table A10a
Frequency Table for the SMALSI Study Strategies Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
24	1	1.7	1.7
30	2	3.3	5.0
32	2	3.3	8.3
33	1	1.7	10.0
34	3	5.0	15.0
36	3	5.0	20.0
39	2	3.3	23.3
41	3	5.0	28.3
43	2	3.3	31.7
44	2	3.3	35.0
46	1	1.7	36.7
47	6	10.0	46.7
49	4	6.7	53.3
50	3	5.0	58.3
52	2	3.3	61.7
53	2	3.3	65.0
55	1	1.7	66.7
56	3	5.0	71.7
58	3	5.0	76.7
59	1	1.7	78.3
60	2	3.3	81.7
62	6	10.0	91.7
65	2	3.3	95.0
66	2	3.3	98.3
70	1	1.7	100.0

Table A10b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
25	1	1.7	1.7
28	2	3.3	5.0
33	3	5.0	10.0
34	2	3.3	13.3
35	2	3.3	16.7
37	1	1.7	18.3
38	3	5.0	23.3
39	1	1.7	25.0
41	2	3.3	28.3
42	1	1.7	30.0
43	2	3.3	33.3
44	2	3.3	36.7
46	2	3.3	40.0
48	5	8.3	48.3
49	1	1.7	50.0
51	3	5.0	55.0
52	3	5.0	60.0
53	3	5.0	65.0
54	3	5.0	70.0
57	6	10.0	80.0
59	2	3.3	83.3
60	2	3.3	86.7
61	2	3.3	90.0
62	1	1.7	91.7
63	1	1.7	93.3
66	1	1.7	95.0
69	2	3.3	98.3
74	1	1.7	100.0

Table A10c

Frequency Table for the SMALSI Reading/Comprehension Strategies Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
24	1	1.7	1.7
29	1	1.7	3.3
31	3	5.0	8.3
32	1	1.7	10.0
33	1	1.7	11.7
35	2	3.3	15.0
36	2	3.3	18.3
41	2	3.3	21.7
42	1	1.7	23.3
44	2	3.3	26.7
45	5	8.3	35.0
47	3	5.0	40.0
48	2	3.3	43.3
49	3	5.0	48.3
51	3	5.0	53.3
52	1	1.7	55.0
53	4	6.7	61.7
54	1	1.7	63.3
55	2	3.3	66.7
57	3	5.0	71.7
58	4	6.7	78.3
59	3	5.0	83.3
60	3	5.0	88.3
62	2	3.3	91.7
65	1	1.7	93.3
67	2	3.3	96.7
70	1	1.7	98.3
74	1	1.7	100.00

Table A10d

Frequency Table for the SMALSI Writing/Research Skills Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
22	1	1.7	1.7
24	1	1.7	3.3
29	1	1.7	5.0
31	2	3.3	8.3
32	1	1.7	10.0
34	1	1.7	11.7
36	2	3.3	15.0
38	2	3.3	18.3
40	4	6.7	25.0
42	3	5.0	30.0
44	3	5.0	35.0
45	4	6.7	41.7
47	6	10.0	51.7
50	5	8.3	60.0
52	1	1.7	61.7
53	2	3.3	65.0
55	4	6.7	71.7
57	3	5.0	76.7
59	5	8.3	85.0
61	1	1.7	86.7
63	3	5.0	91.7
65	1	1.7	93.3
69	3	5.0	98.3
75	1	1.7	100.0

Table A10e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
25	1	1.7	1.7
29	1	1.7	3.3
30	1	1.7	5.0
33	2	3.3	8.3
36	2	3.3	11.7
39	2	3.3	15.0
40	2	3.3	18.3
42	3	5.0	23.3
44	2	3.3	26.7
45	3	5.0	31.7
47	1	1.7	33.3
48	4	6.7	40.0
50	1	1.7	41.7
51	4	6.7	48.3
53	4	6.7	55.0
54	3	5.0	60.0
56	3	5.0	65.0
58	2	3.3	68.3
59	6	10.0	78.3
61	3	5.0	83.3
63	3	5.0	88.3
65	2	3.3	91.7
66	1	1.7	93.3
68	1	1.7	95.0
71	2	3.3	98.3
77	1	1.7	100.0

Table A10f

Frequency Table for the SMALSI Time Management/Organizational Techniques Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
27	1	1.7	1.7
28	2	3.3	5.0
29	2	3.3	8.3
30	1	1.7	10.0
35	2	3.3	13.3
36	1	1.7	15.0
38	2	3.3	18.3
39	6	10.0	28.3
41	3	5.0	33.3
43	3	5.0	38.3
44	4	6.7	45.0
46	3	5.0	50.0
47	4	6.7	56.7
48	3	5.0	61.7
49	4	6.7	68.3
50	1	1.7	70.0
51	2	3.3	73.3
53	4	6.7	80.0
54	2	3.3	83.3
55	2	3.3	86.7
56	1	1.7	88.3
57	1	1.7	90.0
59	1	1.7	91.7
61	2	3.3	95.0
63	1	1.7	96.7
64	1	1.7	98.3
66	1	1.7	100.0

Table A10g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
27	2	3.3	3.3
32	4	6.7	10.0
35	2	3.3	13.3
37	2	3.3	16.7
39	1	1.7	18.3
41	3	5.0	23.3
43	1	1.7	25.0
44	2	3.3	28.3
45	5	8.3	36.7
46	1	1.7	38.3
48	3	5.0	43.3
49	1	1.7	45.0
51	1	1.7	46.7
52	2	3.3	50.0
53	2	3.3	53.3
54	2	3.3	56.7
55	3	5.0	61.7
56	2	3.3	65.0
57	1	1.7	66.7
58	2	3.3	70.0
59	2	3.3	73.3
60	5	8.3	81.7
61	2	3.3	85.0
63	2	3.3	88.3
65	1	1.7	90.0
66	2	3.3	93.3
67	1	1.7	95.0
69	1	1.7	96.7
71	1	1.7	98.3
78	1	1.7	100.0

Table A10h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
36	1	1.7	1.7
38	2	3.3	5.0
39	1	1.7	6.7
40	1	1.7	8.3
41	3	5.0	13.3
42	2	3.3	16.7
43	1	1.7	18.3
44	2	3.3	21.7
45	4	6.7	28.3
46	2	3.3	31.7
47	1	1.7	33.3
48	8	13.3	46.7
49	2	3.3	50.0
50	1	1.7	51.7
52	3	5.0	56.7
54	2	3.3	60.0
55	2	3.3	63.3
56	4	6.7	70.0
57	6	10.0	80.0
58	1	1.7	81.7
59	3	5.0	86.7
60	1	1.7	88.3
61	1	1.7	90.0
62	1	1.7	91.7
63	1	1.7	93.3
65	1	1.7	95.0
67	1	1.7	96.7
71	1	1.7	98.3
80	1	1.7	100.0

Table A10i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
25	1	1.7	1.7
33	3	5.0	6.7
36	3	5.0	11.7
38	3	5.0	16.7
39	1	1.7	18.3
41	1	1.7	20.0
42	6	10.0	30.0
43	4	6.7	36.7
44	3	5.0	41.7
45	2	3.3	45.0
47	4	6.7	51.7
48	3	5.0	56.7
49	3	5.0	61.7
50	3	5.0	66.7
51	3	5.0	71.7
53	2	3.3	75.0
54	2	3.3	78.3
56	3	5.0	83.3
57	2	3.3	86.7
59	1	1.7	88.3
60	1	1.7	90.0
62	2	3.3	93.3
69	1	1.7	95.0
70	2	3.3	98.3
75	1	1.7	100.0

Table A11a

Frequency Table for the SMALSI Study Strategies Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
30	1	1.5	1.5
32	2	2.9	4.4
33	1	1.5	5.9
36	1	1.5	7.4
37	2	2.9	10.3
38	1	1.5	11.8
39	3	4.4	16.2
40	4	5.9	22.1
41	3	4.4	26.5
43	4	5.9	32.4
44	3	4.4	36.8
46	2	2.9	39.7
47	5	7.4	47.1
49	4	5.9	52.9
50	2	2.9	55.9
52	2	2.9	58.8
53	2	2.9	61.8
55	4	5.9	67.6
56	3	4.4	72.1
58	5	7.4	79.4
59	4	5.9	85.3
60	1	1.5	86.8
62	3	4.4	91.2
65	1	1.5	92.6
68	3	4.4	97.1
72	1	1.5	98.5
75	1	1.5	100.0

Table A11b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
25	1	1.5	1.5
30	2	2.9	4.4
32	1	1.5	5.9
33	3	4.4	10.3
34	3	4.4	14.7
35	2	2.9	17.6
36	1	1.5	19.1
38	1	1.5	20.6
39	1	1.5	22.1
41	3	4.4	26.5
42	3	4.4	30.9
43	5	7.4	38.2
44	1	1.5	39.7
47	3	4.4	44.1
49	2	2.9	47.1
51	3	4.4	51.5
52	2	2.9	54.4
53	7	10.3	64.7
54	2	2.9	67.6
55	4	5.9	73.5
57	4	5.9	79.4
58	2	2.9	82.4
59	2	2.9	85.3
60	1	1.5	86.8
61	2	2.9	89.7
62	1	1.5	91.2
63	2	2.9	94.1
65	1	1.5	95.6
66	1	1.5	97.1
67	1	1.5	98.5
75	1	1.5	100.0

Table A11c

Frequency Table for the SMALSI Reading/Comprehension Strategies Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
31	1	1.5	1.5
33	1	1.5	2.9
35	2	2.9	5.9
36	2	2.9	8.8
38	2	2.9	11.8
39	5	7.4	19.1
41	2	2.9	22.1
42	2	2.9	25.0
44	5	7.4	32.4
45	2	2.9	35.3
47	5	7.4	42.6
48	5	7.4	50.0
49	3	4.4	54.4
51	5	7.4	61.8
52	2	2.9	64.7
53	5	7.4	72.1
54	2	2.9	75.0
57	2	2.9	77.9
58	1	1.5	79.4
60	5	7.4	86.8
62	3	4.4	91.2
70	2	2.9	94.1
72	2	2.9	97.1
73	1	1.5	98.5
76	1	1.5	100.0

Table A11d

Frequency Table for the SMALSI Writing/Research Skills Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
29	1	1.5	1.5
31	2	2.9	4.4
32	1	1.5	5.9
34	2	2.9	8.8
38	2	2.9	11.8
40	1	1.5	13.2
42	2	2.9	16.2
44	4	5.9	22.1
45	5	7.4	29.4
47	2	2.9	32.4
50	5	7.4	39.7
52	4	5.9	45.6
53	3	4.4	50.0
55	5	7.4	57.4
57	6	8.8	66.2
59	4	5.9	72.1
61	2	2.9	75.0
63	1	1.5	76.5
65	2	2.9	79.4
67	5	7.4	86.8
69	1	1.5	88.2
73	1	1.5	89.7
75	4	5.9	95.6
80	3	4.4	100.0

Table A11e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
28	1	1.5	1.5
30	1	1.5	2.9
32	1	1.5	4.4
34	2	2.9	7.4
36	1	1.5	8.8
37	3	4.4	13.2
39	2	2.9	16.2
40	2	2.9	19.1
42	4	5.9	25.0
44	3	4.4	29.4
45	3	4.4	33.8
47	1	1.5	35.3
48	3	4.4	39.7
50	5	7.4	47.1
51	6	8.8	55.9
53	1	1.5	57.4
54	4	5.9	63.2
56	2	2.9	66.2
58	1	1.5	67.6
59	1	1.5	69.1
61	2	2.9	72.1
63	5	7.4	79.4
65	4	5.9	85.3
66	4	5.9	91.2
71	4	5.9	97.1
73	2	2.9	100.0

Table A11f

Frequency Table for the SMALSI Time Management/Organizational Techniques Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
29	2	2.9	2.9
30	1	1.5	4.4
31	1	1.5	5.9
36	3	4.4	10.3
38	1	1.5	11.8
39	1	1.5	13.2
41	1	1.5	14.7
42	4	5.9	20.6
43	3	4.4	25.0
44	4	5.9	30.9
46	3	4.4	35.3
47	5	7.4	42.6
48	3	4.4	47.1
49	1	1.5	48.5
50	4	5.9	54.4
51	3	4.4	58.8
53	2	2.9	61.8
54	2	2.9	64.7
55	3	4.4	69.1
56	3	4.4	73.5
57	1	1.5	75.0
58	3	4.4	79.4
59	3	4.4	83.8
61	3	4.4	88.2
66	1	1.5	89.7
67	1	1.5	91.2
69	1	1.5	92.6
70	1	1.5	94.1
71	1	1.5	95.6
76	1	1.5	98.5
80	1	1.5	100.0

Table A11g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
27	3	4.4	4.4
32	2	2.9	7.4
35	5	7.4	14.7
37	3	4.4	19.1
39	5	7.4	26.5
41	2	2.9	29.4
43	4	5.9	35.3
44	3	4.4	39.7
45	1	1.5	41.2
46	2	2.9	44.1
48	2	2.9	47.1
49	3	4.4	51.5
50	1	1.5	52.9
51	1	1.5	54.4
52	2	2.9	57.4
53	3	4.4	61.8
56	1	1.5	63.2
57	3	4.4	67.6
59	1	1.5	69.1
61	5	7.4	76.5
64	3	4.4	80.9
65	1	1.5	82.4
66	2	2.9	85.3
67	1	1.5	86.8
68	2	2.9	89.7
69	2	2.9	92.6
70	2	2.9	95.6
72	2	2.9	98.5
74	1	1.5	100.0

Table A11h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
29	2	2.9	2.9
33	2	2.9	5.9
35	1	1.5	7.4
36	2	2.9	10.3
38	2	2.9	13.2
39	6	8.8	22.1
40	1	1.5	23.5
41	6	8.8	32.4
43	2	2.9	35.3
45	3	4.4	39.7
46	2	2.9	42.6
47	1	1.5	44.1
48	4	5.9	50.0
49	1	1.5	51.5
50	2	2.9	54.4
51	3	4.4	58.8
53	3	4.4	63.2
54	2	2.9	66.2
55	2	2.9	69.1
56	1	1.5	70.6
57	4	5.9	76.5
58	2	2.9	79.4
60	3	4.4	83.8
62	1	1.5	85.3
63	1	1.5	86.8
64	2	2.9	89.7
65	2	2.9	92.6
69	3	4.4	97.1
70	1	1.5	98.5
77	1	1.5	100.0

Table A11i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
20	1	1.5	1.5
25	2	2.9	4.4
28	4	5.9	10.3
31	3	4.4	14.7
33	5	7.4	22.1
36	1	1.5	23.5
38	1	1.5	25.0
39	2	2.9	27.9
41	3	4.4	32.4
42	2	2.9	35.3
43	5	7.4	42.6
44	3	4.4	47.1
47	1	1.5	48.5
48	1	1.5	50.0
50	2	2.9	52.9
51	1	1.5	54.4
53	1	1.5	55.9
54	2	2.9	58.8
55	2	2.9	61.8
56	1	1.5	63.2
57	3	4.4	67.6
58	1	1.5	69.1
59	2	2.9	72.1
60	3	4.4	76.5
62	1	1.5	77.9
64	1	1.5	79.4
65	1	1.5	80.9
66	1	1.5	82.4
69	1	1.5	83.8
70	1	1.5	85.3
71	1	1.5	86.8
72	1	1.5	88.2
73	1	1.5	89.7
74	2	2.9	92.6
75	2	2.9	95.6
76	1	1.5	97.1
77	2	2.9	100.0

Table A12a

Frequency Table for the SMALSI Study Strategies Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
20	1	2.1	2.1
30	2	4.2	6.2
32	1	2.1	8.3
33	1	2.1	10.4
34	1	2.1	12.5
36	1	2.1	14.6
37	1	2.1	16.7
39	3	6.2	22.9
40	1	2.1	25.0
41	4	8.3	33.3
43	4	8.3	41.7
44	3	6.2	47.9
46	1	2.1	50.0
47	2	4.2	54.2
50	2	4.2	58.3
52	3	6.2	64.6
53	3	6.2	70.8
55	3	6.2	77.1
56	6	12.5	89.6
60	2	4.2	93.8
63	2	4.2	97.9
70	1	2.1	100.0

Table A12b

Frequency Table for the SMALSI Note Taking/Listening Skills Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
25	1	2.1	2.1
30	1	2.1	4.2
33	1	2.1	6.2
34	3	6.2	12.5
35	1	2.1	14.6
36	2	4.2	18.8
38	2	4.2	22.9
39	1	2.1	25.0
41	1	2.1	27.1
42	3	6.2	33.3
43	4	8.3	41.7
44	1	2.1	43.8
46	4	8.3	52.1
47	2	4.2	56.2
49	2	4.2	60.4
51	1	2.1	62.5
52	3	6.2	68.8
54	3	6.2	75.0
55	2	4.2	79.2
57	2	4.2	83.3
58	2	4.2	87.5
59	3	6.2	93.8
61	1	2.1	95.8
63	1	2.1	97.9
65	1	2.1	100.0

Table A12c
Frequency Table for the SMALSI Reading/Comprehension Strategies Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
26	2	4.2	4.2
27	2	4.2	8.3
29	1	2.1	10.4
32	1	2.1	12.5
35	1	2.1	14.6
36	1	2.1	16.7
41	4	8.3	25.0
42	3	6.2	31.2
44	2	4.2	35.4
45	1	2.1	37.5
47	3	6.2	43.8
48	3	6.2	50.0
49	5	10.4	60.4
52	2	4.2	64.6
53	4	8.3	72.9
55	2	4.2	77.1
57	1	2.1	79.2
59	4	8.3	87.5
60	2	4.2	91.7
62	1	2.1	93.8
63	1	2.1	95.8
65	1	2.1	97.9
71	1	2.1	100.0

Table A12d

Frequency Table for the SMALSI Writing/Research Skills Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
25	1	2.1	2.1
32	1	2.1	4.2
34	2	4.2	8.3
36	1	2.1	10.4
38	1	2.1	12.5
40	1	2.1	14.6
42	2	4.2	18.8
44	4	8.3	27.1
45	6	12.5	39.6
47	1	2.1	41.7
50	2	4.2	45.8
52	6	12.5	58.3
53	5	10.4	68.8
55	2	4.2	72.9
57	1	2.1	75.0
59	1	2.1	77.1
61	6	12.5	89.6
63	2	4.2	93.8
65	1	2.1	95.8
67	2	4.2	100.0

Table A12e

Frequency Table for the SMALSI Test-Taking Strategies Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
29	2	4.2	4.2
32	1	2.1	6.2
34	2	4.2	10.4
36	3	6.2	16.7
37	3	6.2	22.9
40	2	4.2	27.1
42	1	2.1	29.2
44	2	4.2	33.3
45	2	4.2	37.5
47	2	4.2	41.7
48	3	6.2	47.9
50	3	6.2	54.2
53	6	12.5	66.7
54	4	8.3	75.0
56	2	4.2	79.2
58	2	4.2	83.3
59	1	2.1	85.4
61	2	4.2	89.6
65	1	2.1	91.7
66	3	6.2	97.9
73	1	2.1	100.0

Table A12f

Frequency Table for the SMALSI Time Management/Organizational Techniques Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
25	1	2.1	2.1
30	2	4.2	6.2
34	1	2.1	8.3
35	2	4.2	12.5
36	1	2.1	14.6
38	3	6.2	20.8
39	2	4.2	25.0
41	1	2.1	27.1
42	2	4.2	31.2
43	4	8.3	39.6
44	2	4.2	43.8
46	1	2.1	45.8
47	6	12.5	58.3
48	3	6.2	64.6
49	2	4.2	68.8
50	2	4.2	72.9
51	3	6.2	79.2
54	1	2.1	81.2
55	2	4.2	85.4
56	3	6.2	91.7
57	1	2.1	93.8
59	1	2.1	95.8
61	1	2.1	97.9
62	1	2.1	100.0

Table A12g

Frequency Table for the SMALSI Low Academic Motivation Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
27	1	2.1	2.1
32	1	2.1	4.2
35	1	2.1	6.2
39	1	2.1	8.3
41	4	8.3	16.7
43	4	8.3	25.0
45	2	4.2	29.2
46	3	6.2	35.4
48	3	6.2	41.7
49	5	10.4	52.1
51	2	4.2	56.2
52	2	4.2	60.4
54	1	2.1	62.5
55	1	2.1	64.6
56	2	4.2	68.8
57	2	4.2	72.9
58	1	2.1	75.0
59	2	4.2	79.2
60	1	2.1	81.2
61	1	2.1	83.3
63	1	2.1	85.4
64	1	2.1	87.5
66	1	2.1	89.6
67	1	2.1	91.7
70	2	4.2	95.8
73	1	2.1	97.9
74	1	2.1	100.0

Table A12h

Frequency Table for the SMALSI Test Anxiety Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
27	1	2.1	2.1
36	1	2.1	4.2
38	2	4.2	8.3
39	2	4.2	12.5
40	2	4.2	16.7
42	1	2.1	18.8
44	2	4.2	22.9
45	2	4.2	27.1
46	1	2.1	29.2
47	1	2.1	31.2
48	3	6.2	37.5
49	3	6.2	43.8
50	1	2.1	45.8
51	2	4.2	50.0
52	1	2.1	52.1
53	2	4.2	56.2
54	1	2.1	58.3
55	1	2.1	60.4
56	1	2.1	62.5
57	3	6.2	68.8
60	2	4.2	72.9
62	3	6.2	79.2
64	1	2.1	81.2
65	2	4.2	85.4
66	3	6.2	91.7
67	1	2.1	93.8
75	1	2.1	95.8
77	2	4.2	100.0

Table A12i

Frequency Table for the SMALSI Concentration/Attention Difficulties Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
28	1	2.1	2.1
33	1	2.1	4.2
38	1	2.1	6.2
39	2	4.2	10.4
41	3	6.2	16.7
42	1	2.1	18.8
43	1	2.1	20.8
45	1	2.1	22.9
47	2	4.2	27.1
48	2	4.2	31.2
49	2	4.2	35.4
50	4	8.3	43.8
51	3	6.2	50.0
53	2	4.2	54.2
54	3	6.2	60.4
55	2	4.2	64.6
56	3	6.2	70.8
57	1	2.1	72.9
58	1	2.1	75.0
60	1	2.1	77.1
62	2	4.2	81.2
64	2	4.2	85.4
65	1	2.1	87.5
71	2	4.2	91.7
72	2	4.2	95.8
75	1	2.1	97.9
76	1	2.1	100.0

Table A13a

Frequency Table for the AIMSWeb Computation Normal Curve Equivalent Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
1	1	1.8	1.8
10	1	1.8	3.5
13	1	1.8	5.3
19	7	12.3	17.5
32	3	5.3	22.8
36	2	3.5	26.3
38	1	1.8	28.1
40	1	1.8	29.8
41	2	3.5	33.3
45	4	7.0	40.4
49	4	7.0	47.4
52	3	5.3	52.6
55	6	10.5	63.2
60	2	3.5	66.7
62	3	5.3	71.9
64	1	1.8	73.7
65	4	7.0	80.7
69	2	3.5	84.2
74	1	1.8	86.0
76	5	8.8	94.7
90	1	1.8	96.5
93	1	1.8	98.2
99	1	1.8	100.0

Table A13b

Frequency Table for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
1	1	1.8	1.8
7	3	5.3	7.0
19	3	5.3	12.3
24	5	8.8	21.1
32	6	10.5	31.6
37	2	3.5	35.1
40	5	8.8	43.9
45	6	10.5	54.4
50	6	10.5	64.9
55	2	3.5	68.4
59	1	1.8	70.2
62	6	10.5	80.7
64	1	1.8	82.5
68	3	5.3	87.7
76	2	3.5	91.2
80	2	3.5	94.7
87	1	1.8	96.5
90	1	1.8	98.2
99	1	1.8	100.0

Table A13c

Frequency Table for the AIMSWeb Computation Normal Curve Equivalent Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
7	1	1.5	1.5
10	2	3.0	4.5
15	2	3.0	7.5
19	1	1.5	9.0
20	1	1.5	10.4
24	3	4.5	14.9
29	2	3.0	17.9
31	1	1.5	19.4
32	4	6.0	25.4
36	2	3.0	28.4
38	1	1.5	29.9
40	3	4.5	34.3
41	2	3.0	37.3
42	3	4.5	41.8
44	2	3.0	44.8
46	2	3.0	47.8
47	2	3.0	50.7
48	2	3.0	53.7
51	1	1.5	55.2
53	5	7.5	62.7
56	4	6.0	68.7
59	1	1.5	70.1
62	1	1.5	71.6
63	1	1.5	73.1
65	1	1.5	74.6
66	2	3.0	77.6
67	1	1.5	79.1
68	1	1.5	80.6
70	1	1.5	82.1
71	2	3.0	85.1
74	2	3.0	88.1
80	1	1.5	89.6
81	2	3.0	92.5
85	2	3.0	95.5
93	1	1.5	97.0
99	2	3.0	100.0

Table A13d

Frequency Table for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
1	2	3.0	3.0
7	3	4.5	7.5
15	2	3.0	10.4
24	4	6.0	16.4
31	5	7.5	23.9
36	2	3.0	26.9
41	9	13.4	40.3
48	4	6.0	46.3
52	4	6.0	52.2
56	8	11.9	64.2
63	8	11.9	76.1
69	2	3.0	79.1
72	6	9.0	88.1
80	2	3.0	91.0
83	3	4.5	95.5
90	1	1.5	97.0
99	2	3.0	100.0

Table A13e

Frequency Table for the AIMSWeb Computation Normal Curve Equivalent Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
19	1	2.2	2.2
23	1	2.2	4.4
26	5	11.1	15.6
35	4	8.9	24.4
38	2	4.4	28.9
42	4	8.9	37.8
45	8	17.8	55.6
52	2	4.4	60.0
54	3	6.7	66.7
59	1	2.2	68.9
60	3	6.7	75.6
65	2	4.4	80.0
69	2	4.4	84.4
77	1	2.2	86.7
78	1	2.2	88.9
81	2	4.4	93.3
90	2	4.4	97.8
99	1	2.2	100.0

Table A13f

Frequency Table for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
19	3	6.7	6.7
27	3	6.7	13.3
32	3	6.7	20.0
36	6	13.3	33.3
42	9	20.0	53.3
53	3	6.7	60.0
56	3	6.7	66.7
64	2	4.4	71.1
68	5	11.1	82.2
77	3	6.7	88.9
83	3	6.7	95.6
99	2	4.4	100.0

Table A14a

TAKS Math Standard Scores, Third Grade

Score	Frequency	Percent	Cumulative Percent
515	4	8.0	8.0
524	2	4.0	12.0
534	2	4.0	16.0
545	4	8.0	24.0
556	4	8.0	32.0
569	2	4.0	36.0
582	6	12.0	48.0
598	5	10.0	58.0
616	4	8.0	66.0
640	6	12.0	78.0
669	6	12.0	90.0
720	2	4.0	94.0
738	1	2.0	96.0
788	2	4.0	100.0

Table A14b

TAKS Math Standard Scores, Fourth Grade

Score	Frequency	Percent	Cumulative Percent
567	2	3.1	3.1
575	1	1.5	4.6
584	6	9.2	13.8
593	2	3.1	16.9
603	3	4.6	21.5
614	4	6.2	27.7
626	7	10.8	38.5
639	4	6.2	44.6
654	3	4.6	49.2
672	8	12.3	61.5
698	6	9.2	70.8
724	8	12.3	83.1
774	6	9.2	92.3
842	5	7.7	100.0

Table A14c

TAKS Math Standard Scores, Fifth Grade

Score	Frequency	Percent	Cumulative Percent
516	2	4.3	4.3
551	1	2.2	6.5
558	1	2.2	8.7
564	1	2.2	10.9
592	2	4.3	15.2
606	1	2.2	17.4
613	1	2.2	19.6
621	4	8.7	28.3
629	3	6.5	34.8
638	1	2.2	37.0
657	1	2.2	39.1
667	2	4.3	43.5
678	3	6.5	50.0
691	2	4.3	54.3
706	3	6.5	60.9
738	4	8.7	69.6
745	3	6.5	76.1
775	4	8.7	84.8
825	3	6.5	91.3
893	4	8.7	100.0

APPENDIX B

DISTRIBUTIONS FOR THE MEASURES USED IN THE STUDY

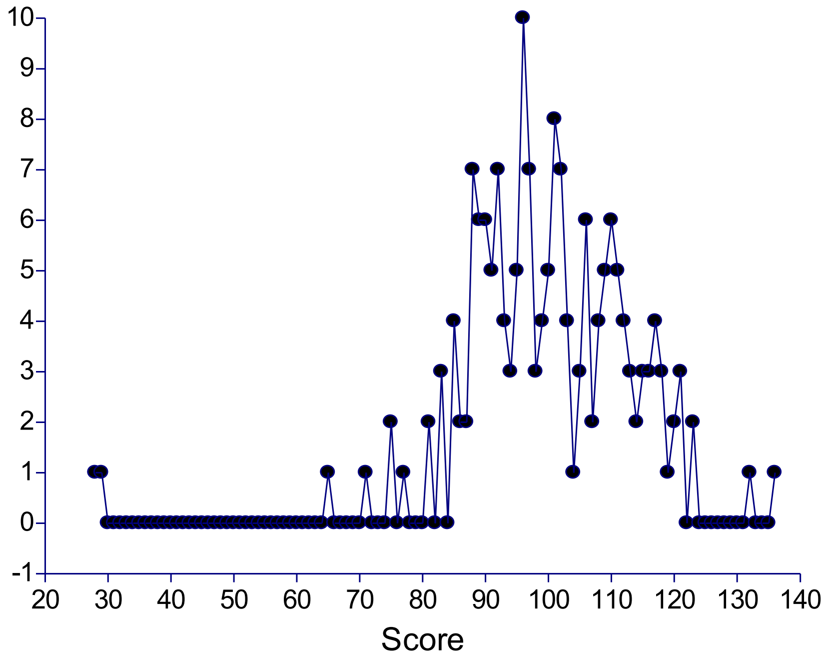

Figure B1a. Distribution for the WJ-III Broad Math Age-Based Standard Scores, Full Sample

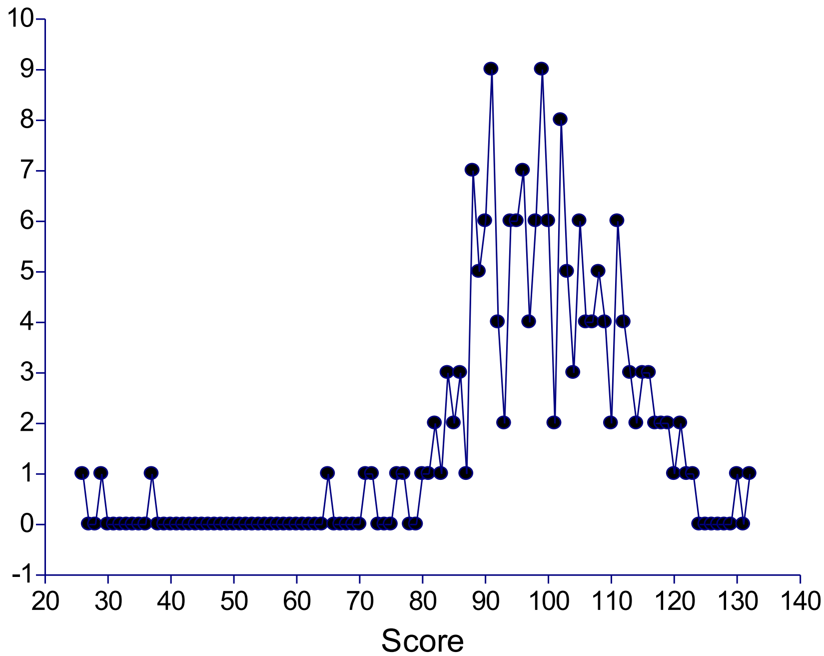

Figure B1b. Distribution for the WJ-III Brief Math Age-Based Standard Scores, Full Sample

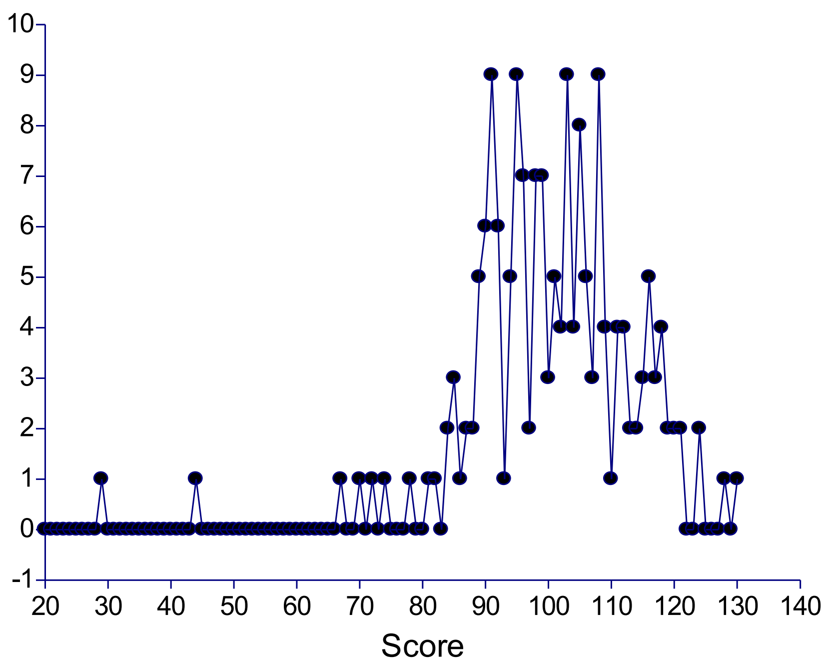

Figure B1c. Distribution for the WJ-III Math Calculation Skills Age-Based Standard Scores, Full Sample

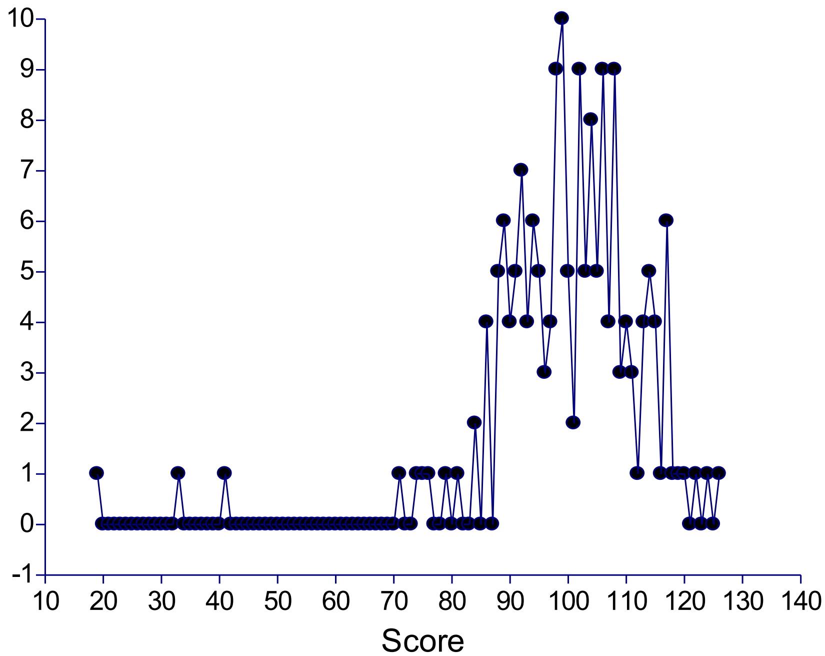

Figure B1d. Distribution for the WJ-III Calculation Age-Based Standard Scores, Full Sample

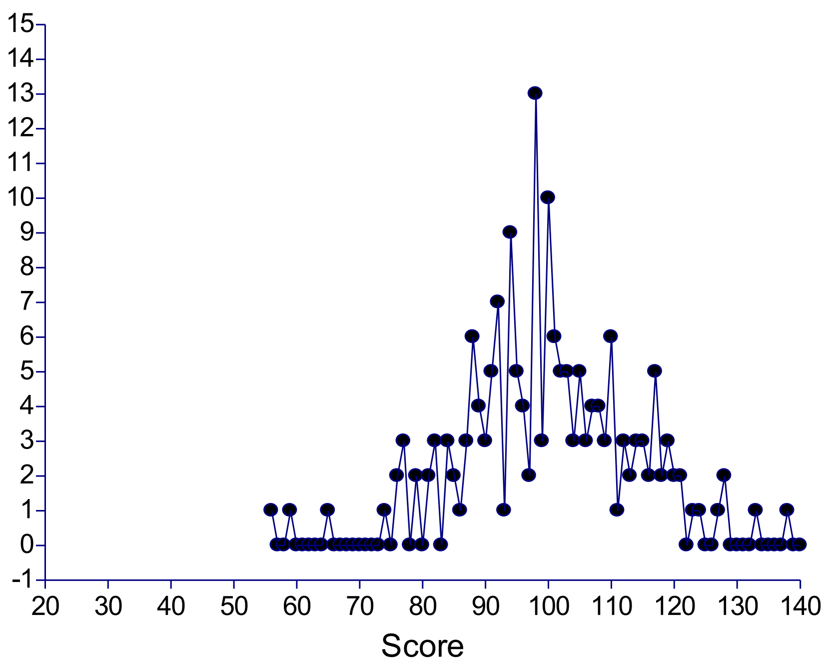

Figure B1e. Distribution for the WJ-III Math Fluency Age-Based Standard Scores, Full Sample

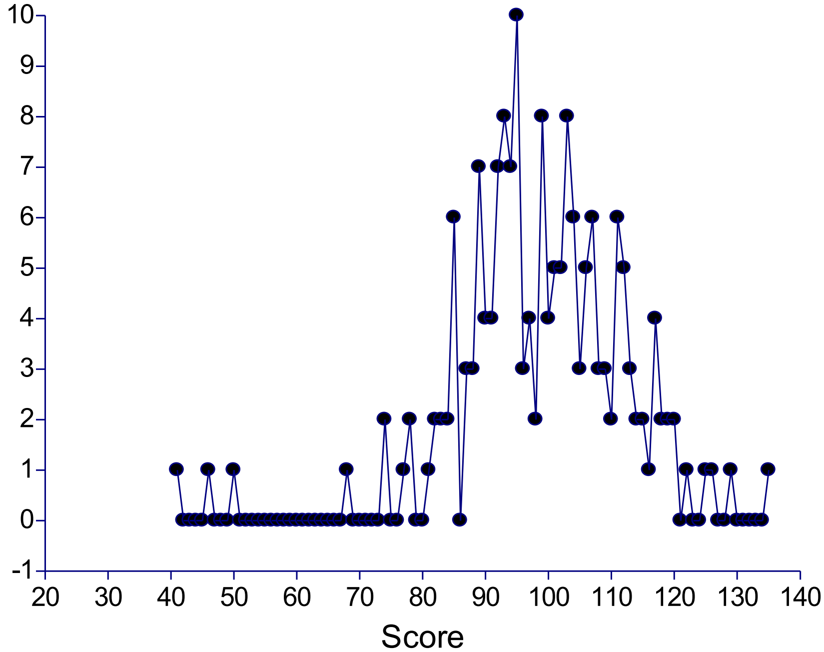

Figure B1f. Distribution for the WJ-III Math Reasoning Age-Based Standard Scores, Full Sample

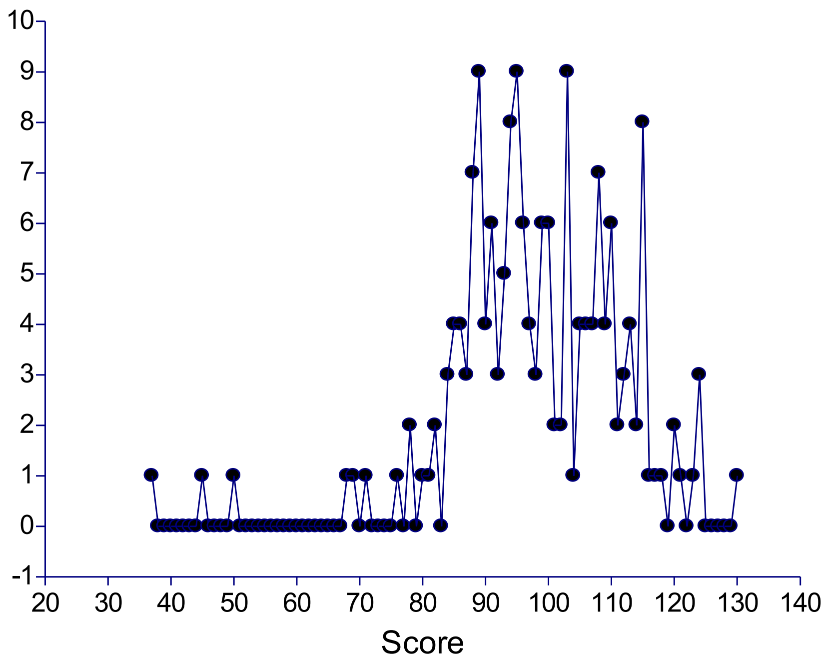

Figure B1g. Distribution for the WJ-III Applied Problems Age-Based Standard Scores, Full Sample

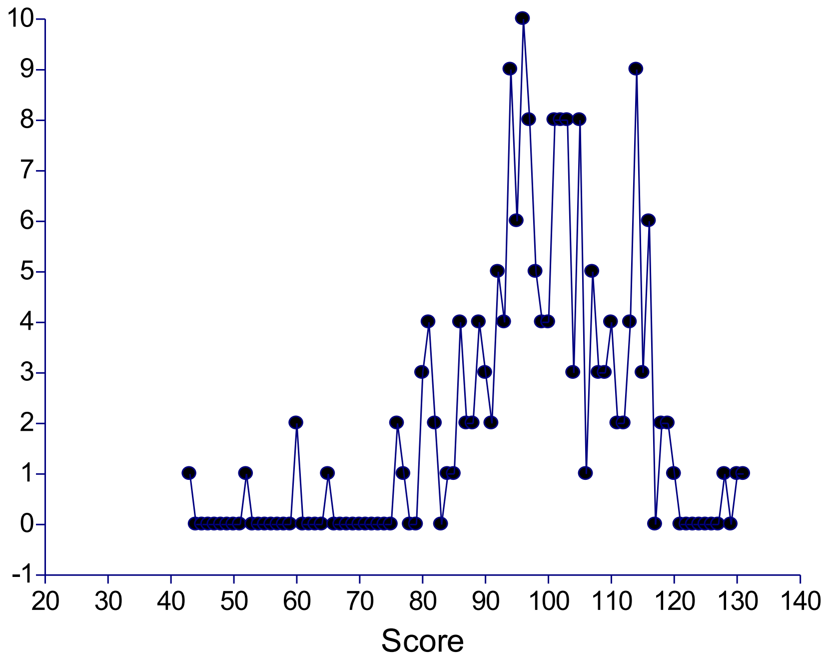

Figure B1h. Distribution for the WJ-III Quantitative Concepts Age-Based Standard Scores, Full Sample

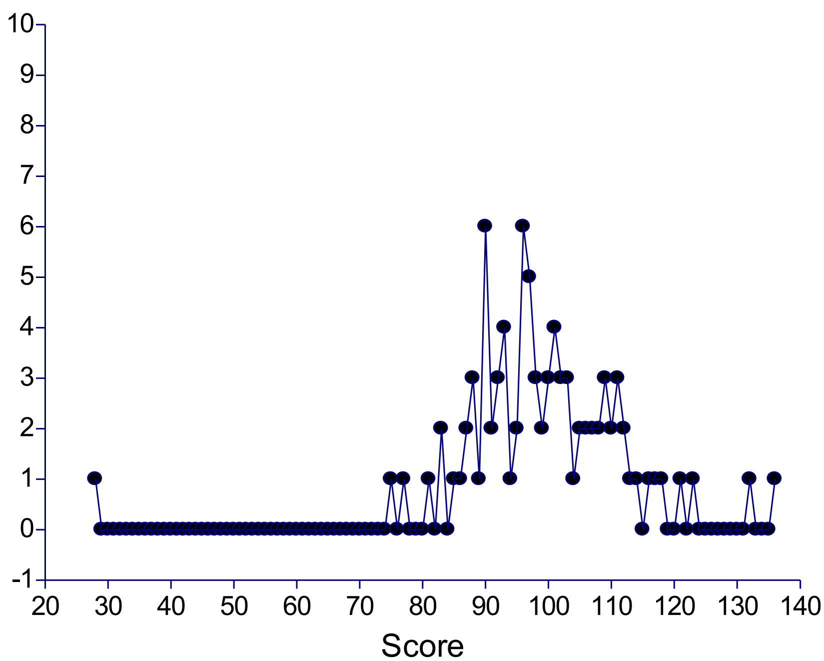

Figure B2a. Distribution for the WJ-III Broad Math Age-Based Standard Scores, Female Participants

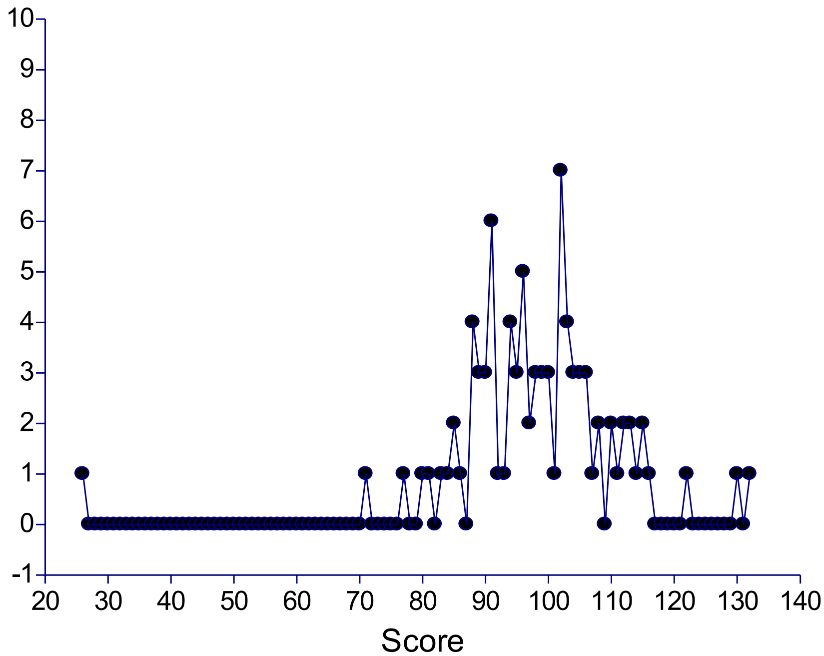

Figure B2b. Distribution for the WJ-III Brief Math Age-Based Standard Scores, Female Participants

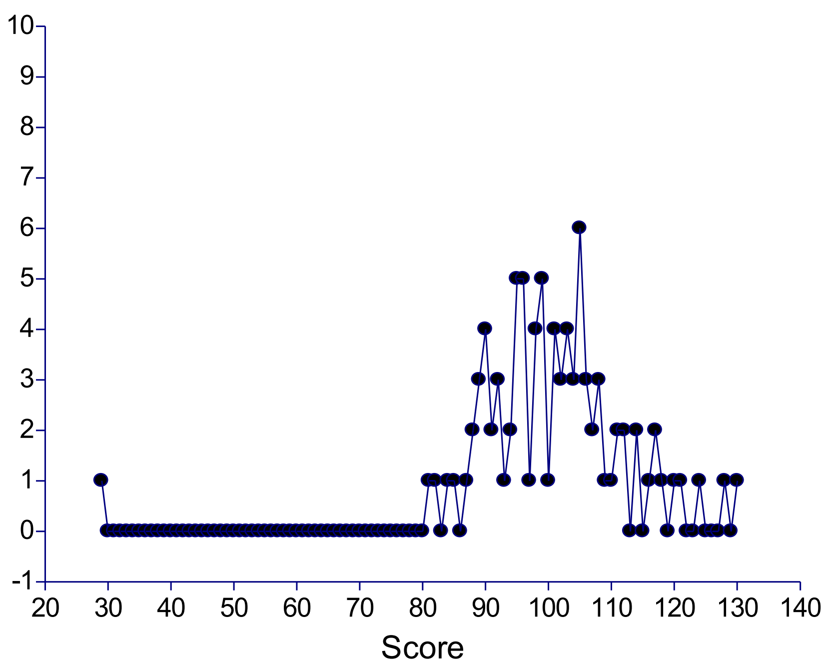

Figure B2c. Distribution for the WJ-III Math Calculation Skills Age-Based Standard Scores, Female Participants

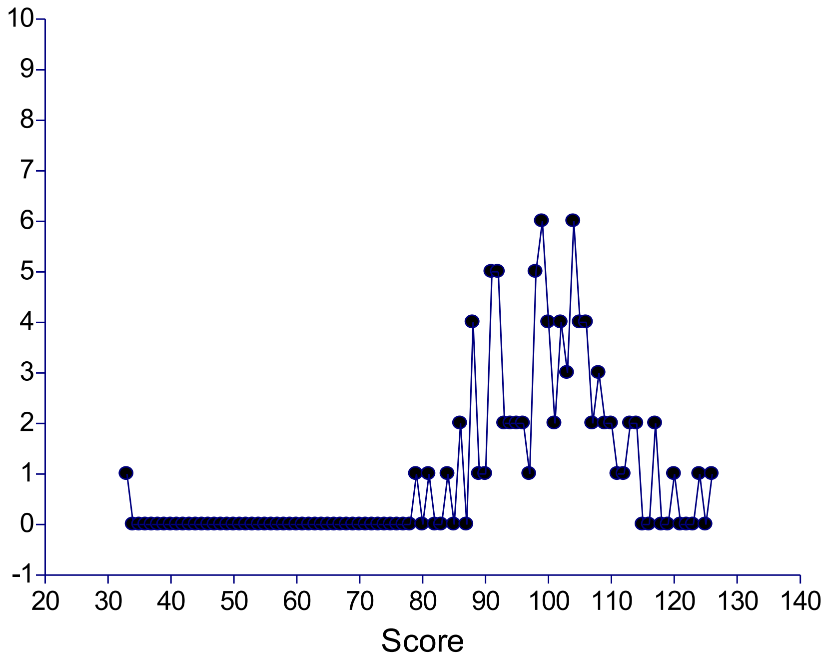

Figure B2d. Distribution for the WJ-III Calculation Age-Based Standard Scores, Female Participants

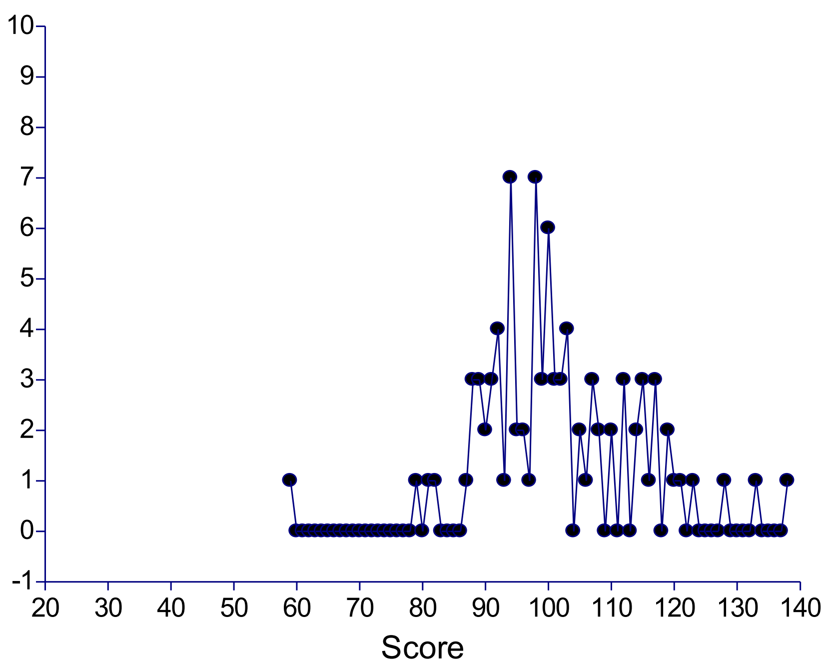

Figure B2e. Distribution for the WJ-III Math Fluency Age-Based Standard Scores, Female Participants

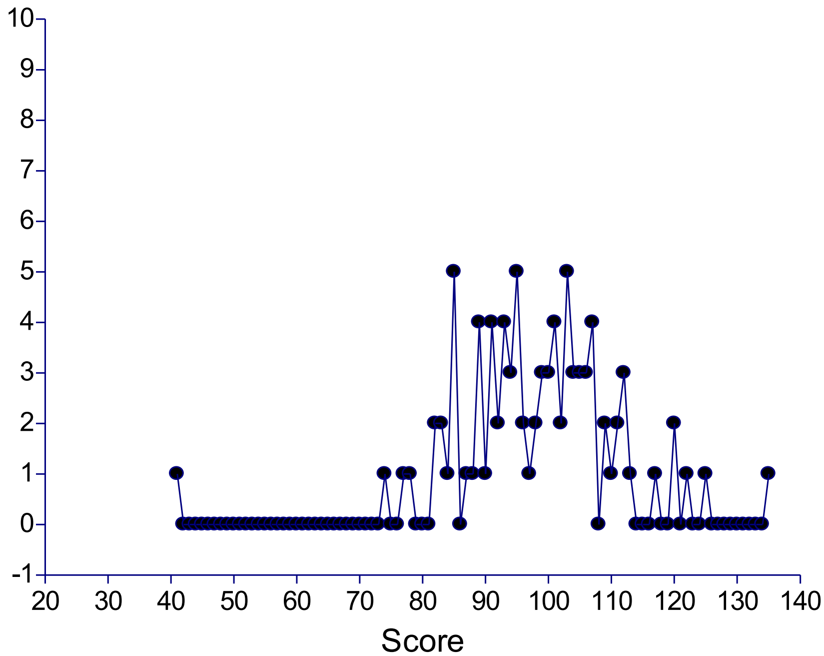

Figure B2f. Distribution for the WJ-III Math Reasoning Age-Based Standard Scores, Female Participants

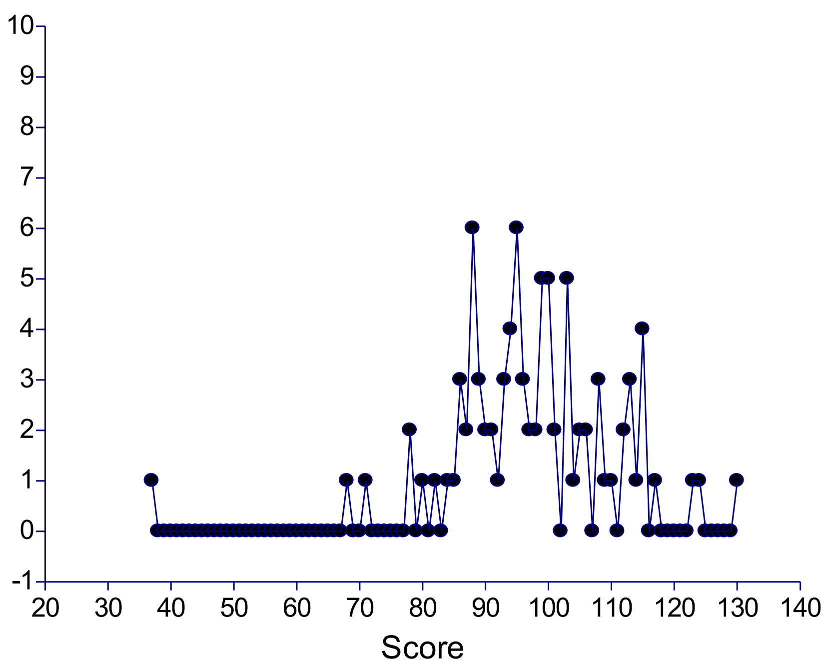

Figure B2g. Distribution for the WJ-III Applied Problems Age-Based Standard Scores, Female Participants

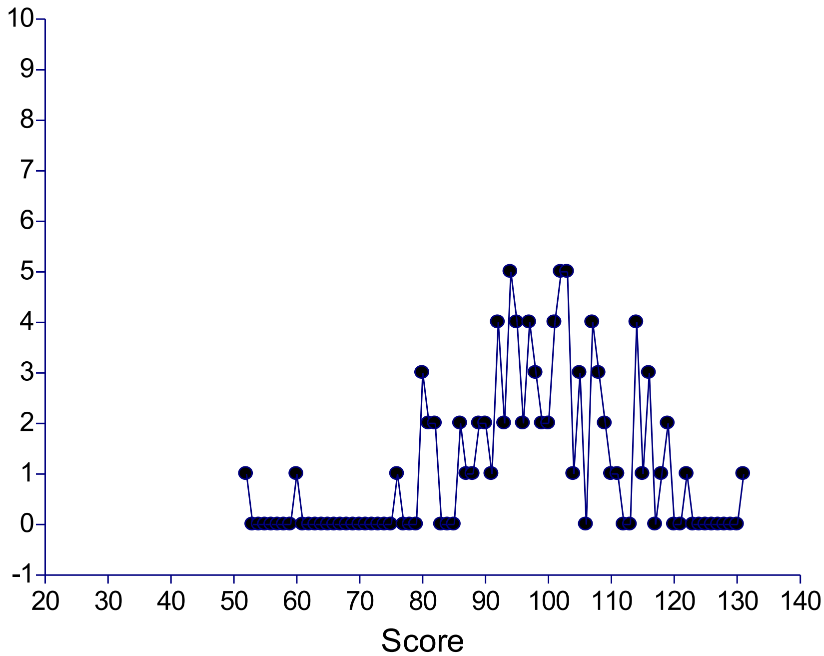

Figure B2h. Distribution for the WJ-III Quantitative Concepts Age-Based Standard Scores, Female Participants

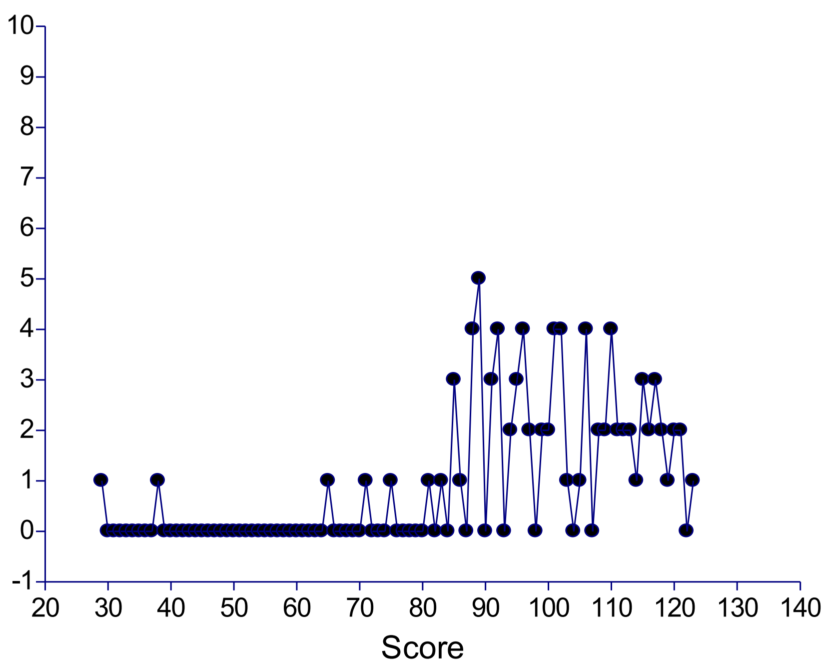

Figure B3a. Distribution for the WJ-III Broad Math Age-Based Standard Scores, Male Participants

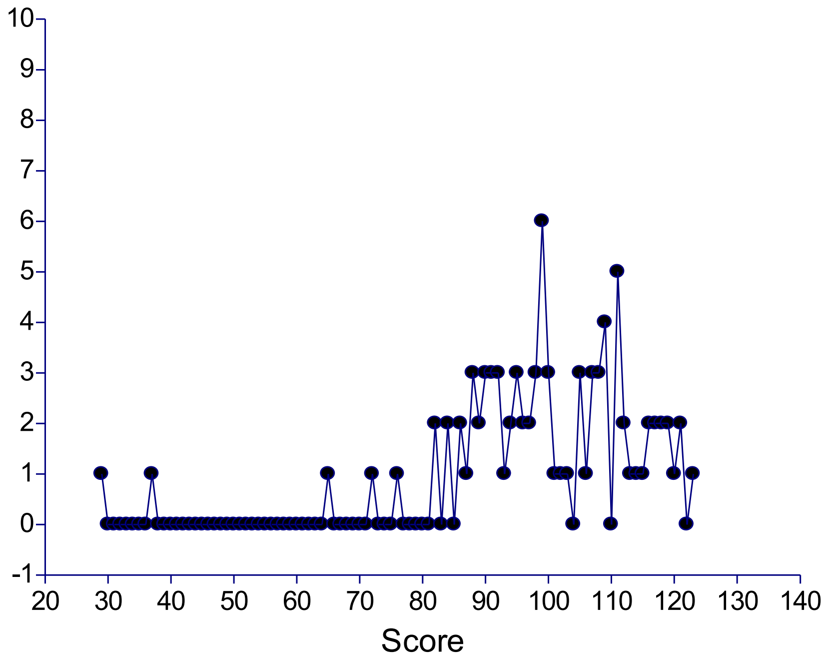

Figure B3b. Distribution for the WJ-III Brief Math Age-Based Standard Scores, Male Participants

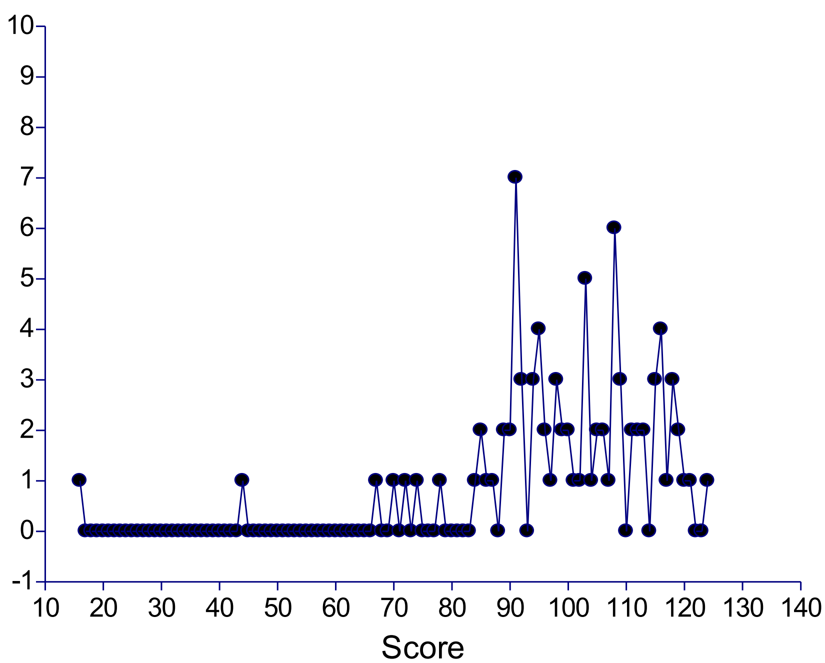

Figure B3c. Distribution for the WJ-III Math Calculation Skills Age-Based Standard Scores, Male Participants

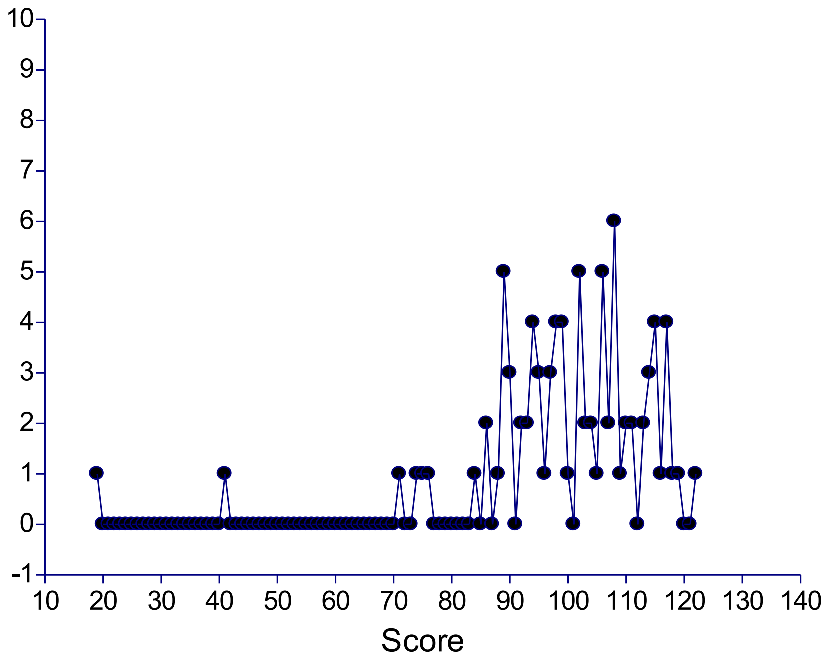

Figure B3d. Distribution for the WJ-III Calculation Age-Based Standard Scores, Male Participants

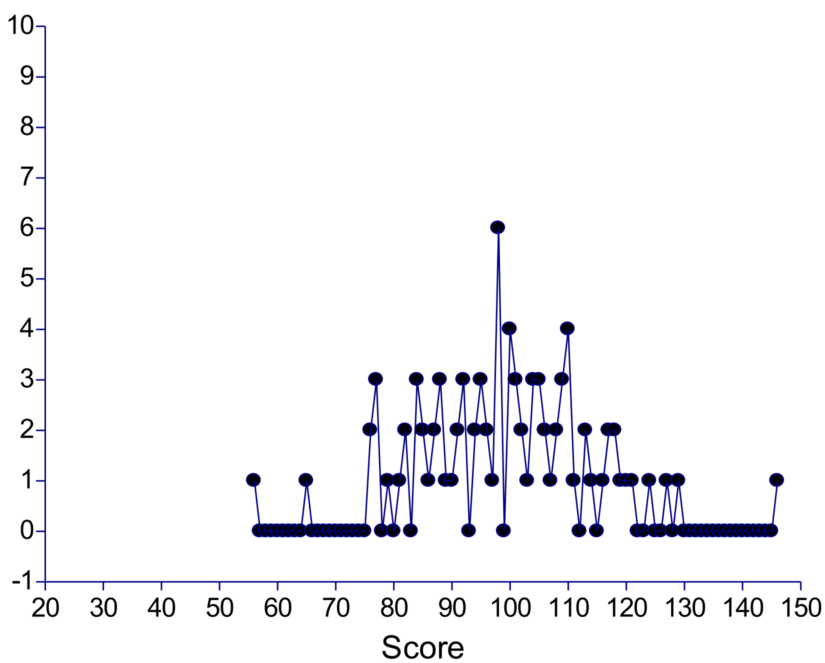

Figure B3e. Distribution for the WJ-III Math Fluency Age-Based Standard Scores, Male Participants

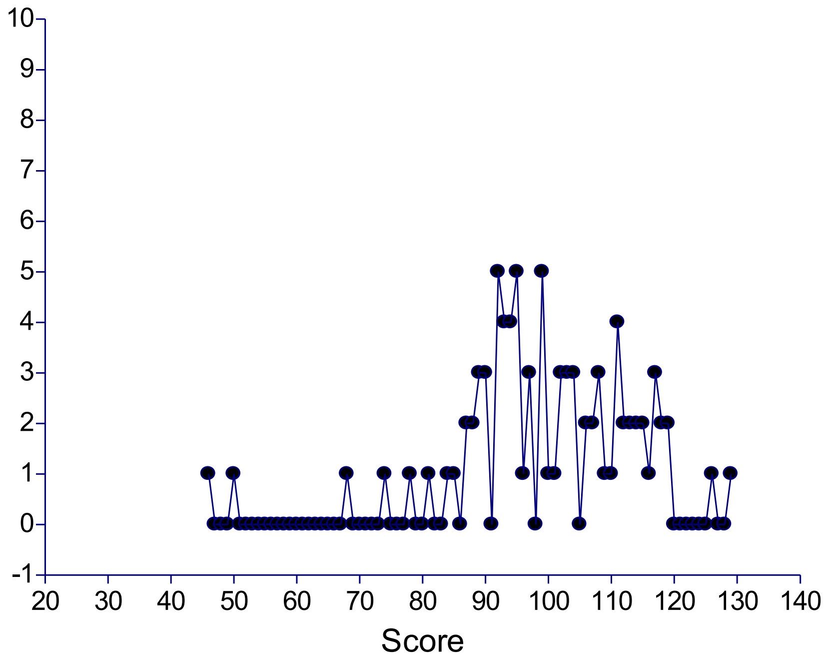

Figure B3f. Distribution for the WJ-III Math Reasoning Age-Based Standard Scores, Male Participants

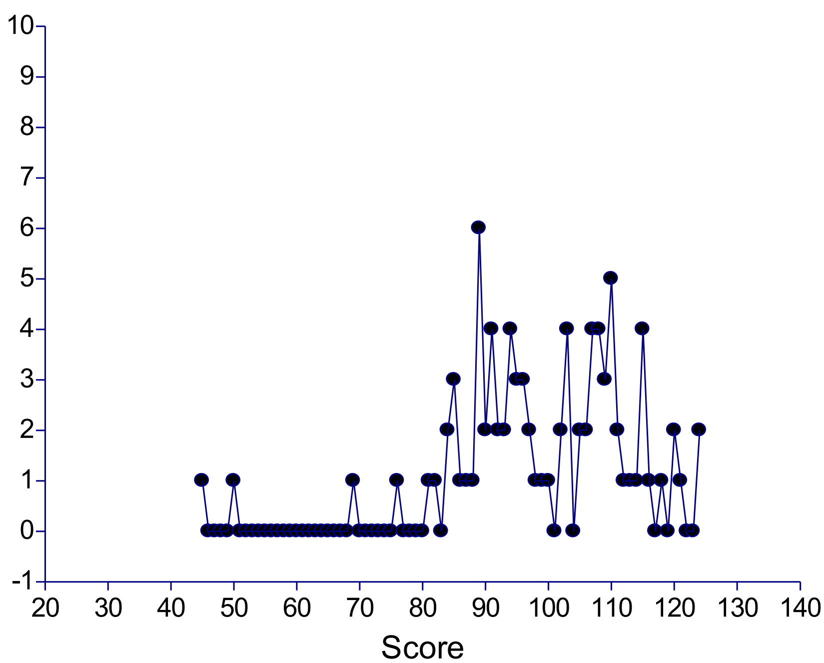

Figure B3g. Distribution for the WJ-III Applied Problems Age-Based Standard Scores, Male Participants

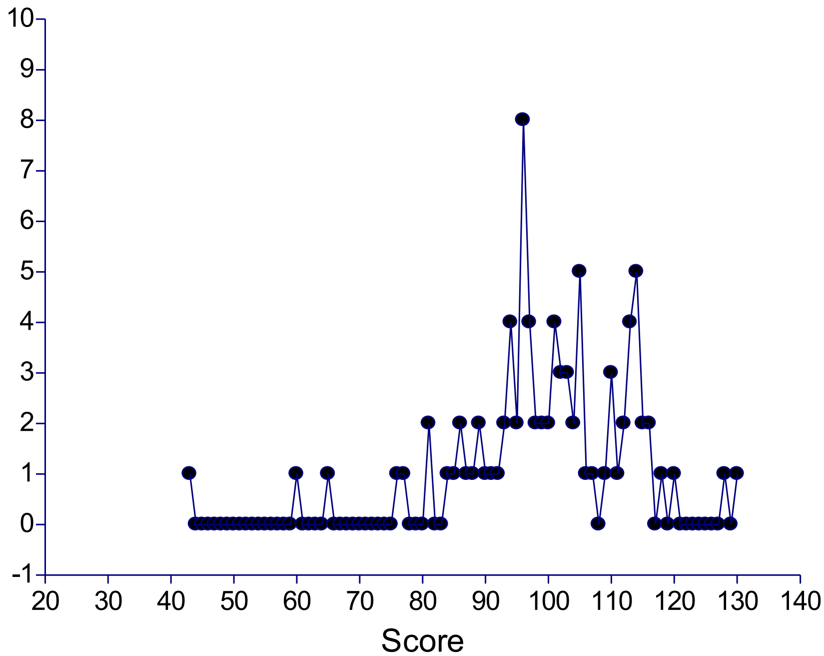

Figure B3h. Distribution for the WJ-III Quantitative Concepts Age-Based Standard Scores, Male Participants

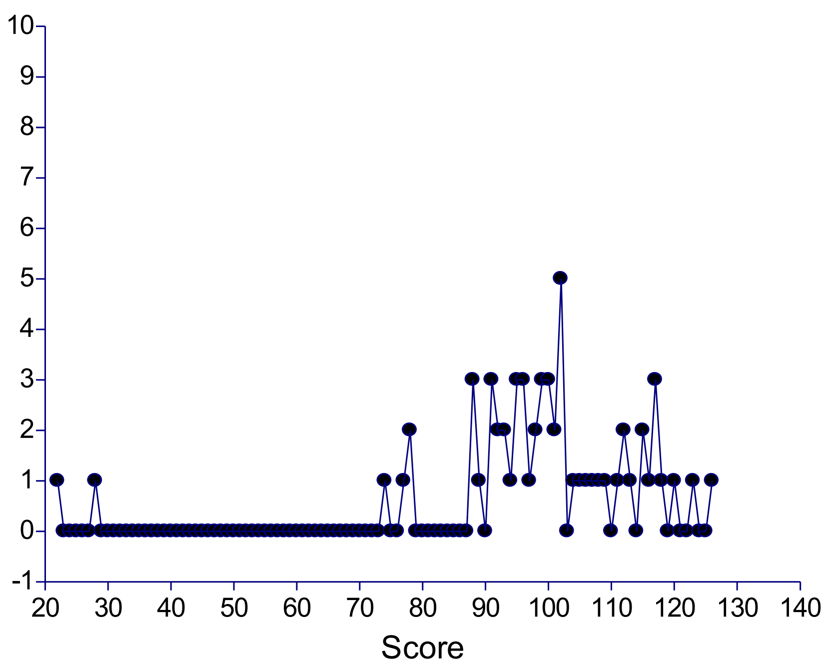

Figure B4a. Distribution for the WJ-III Broad Math Grade-Based Standard Scores, Third Grade

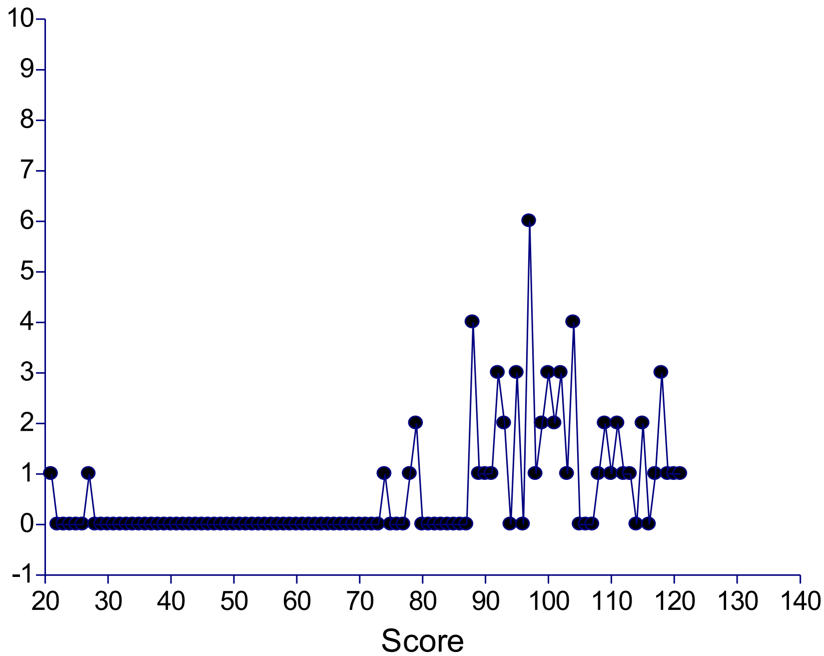

Figure B4b. Distribution for the WJ-III Brief Math Grade-Based Standard Scores, Third Grade

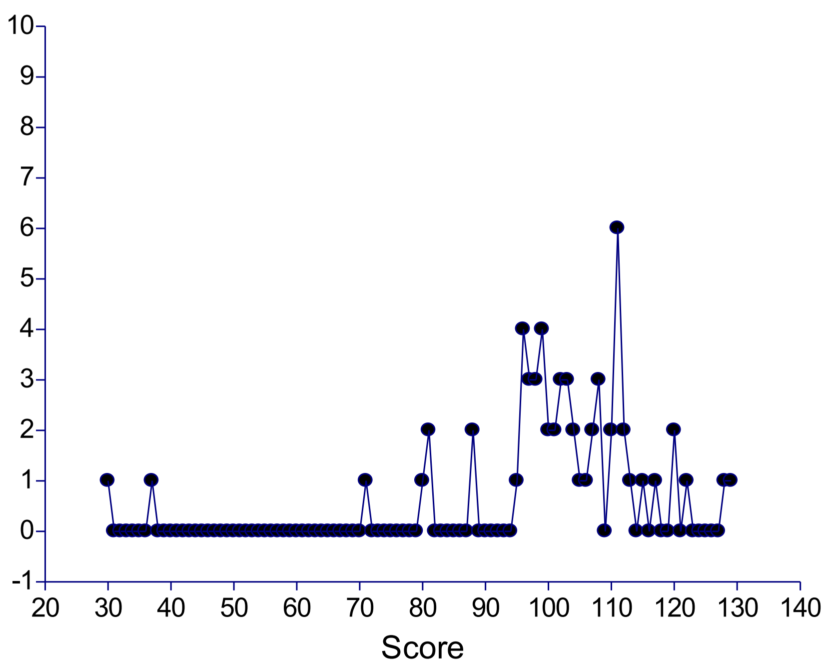

Figure B4c. Distribution for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Third Grade

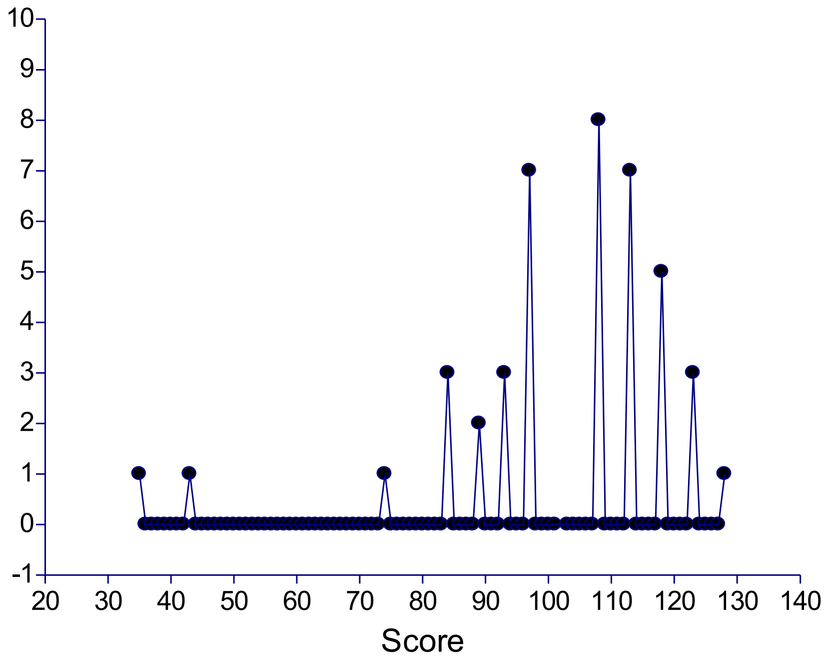

Figure B4d. Distribution for the WJ-III Calculation Grade-Based Standard Scores, Third Grade

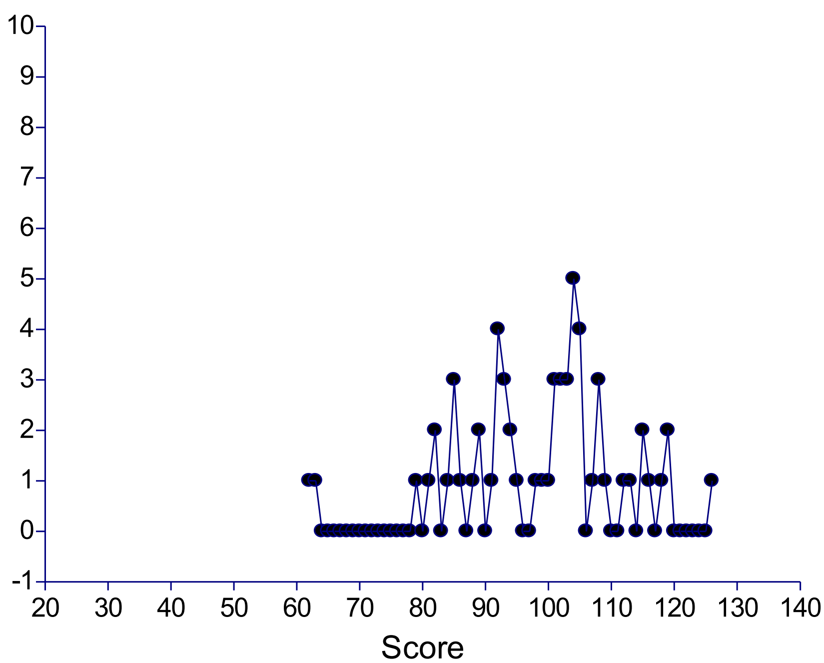

Figure B4e. Distribution for the WJ-III Math Fluency Grade-Based Standard Scores, Third Grade

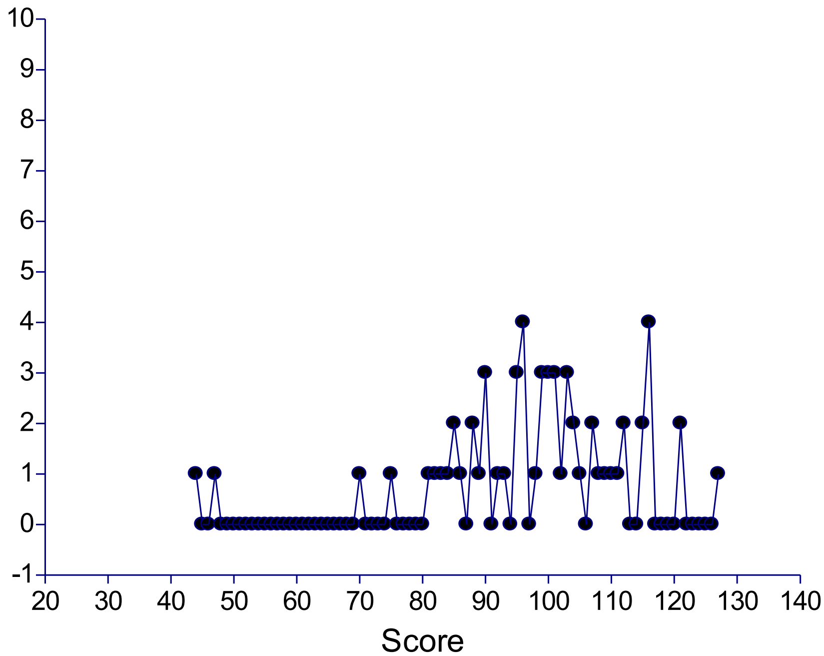

Figure B4f. Distribution for the WJ-III Math Reasoning Grade-Based Standard Scores, Third Grade

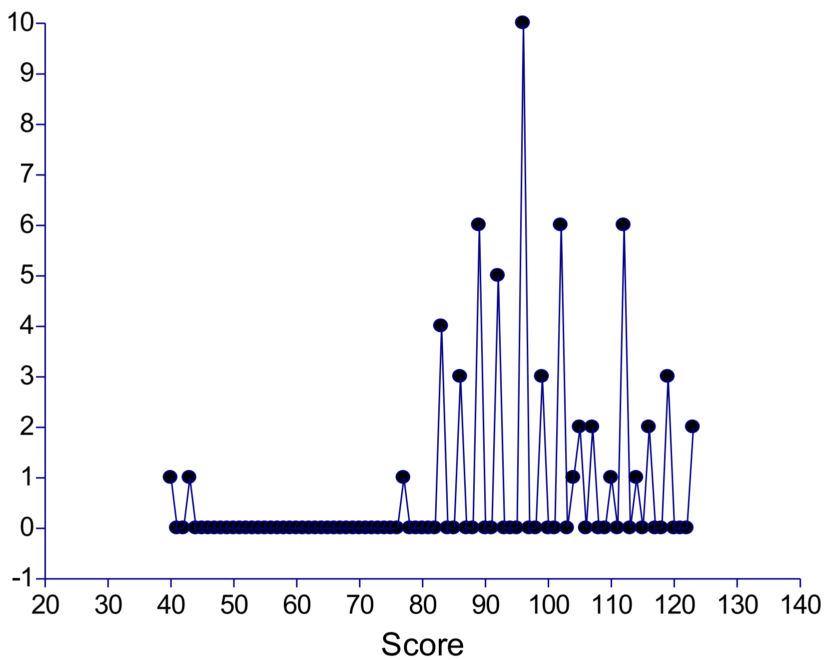

Figure B4g. Distribution for the WJ-III Applied Problems Grade-Based Standard Scores, Third Grade

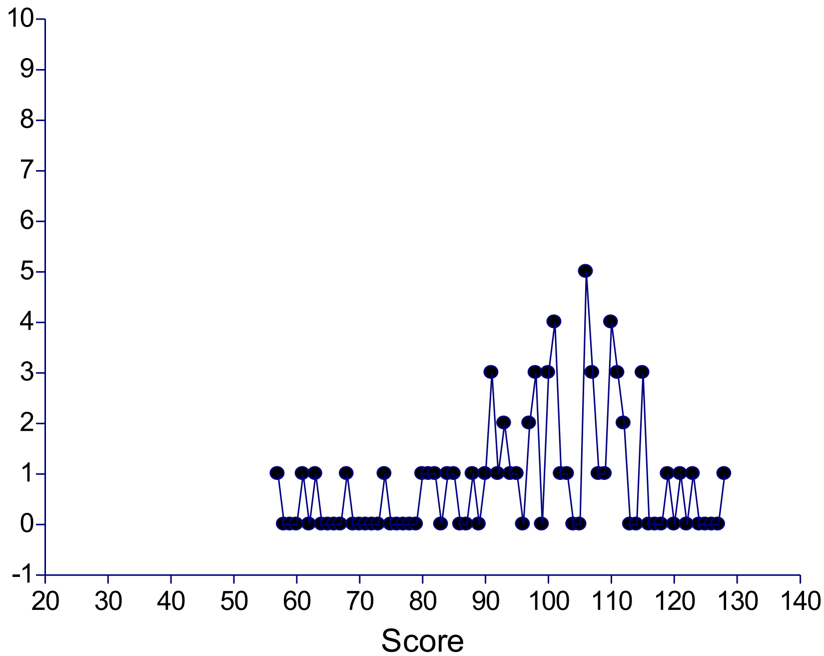

Figure B4h. Distribution for the WJ-III Quantitative Concepts Grade-Based Standard Scores, Third Grade

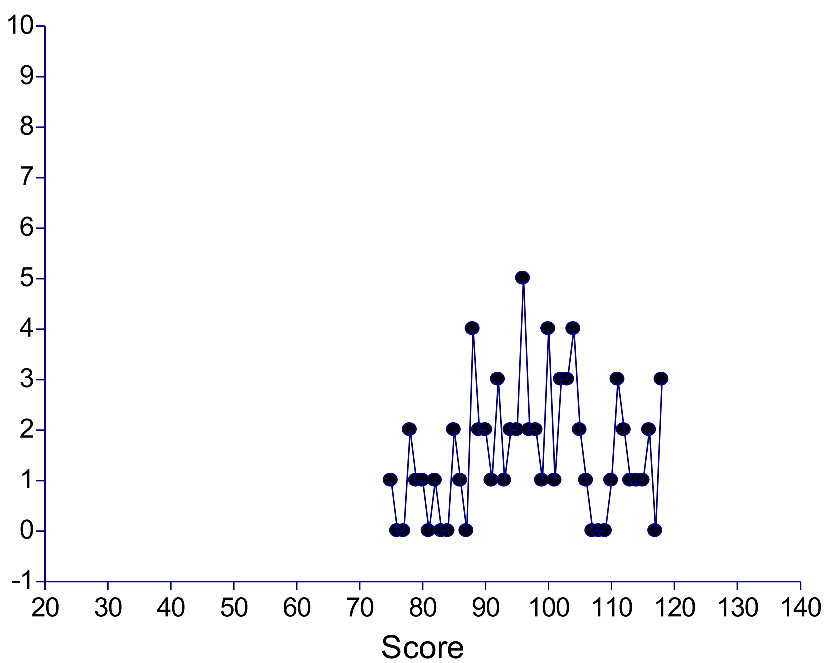

Figure B5a. Distribution for the WJ-III Broad Math Grade-Based Standard Scores, Fourth Grade

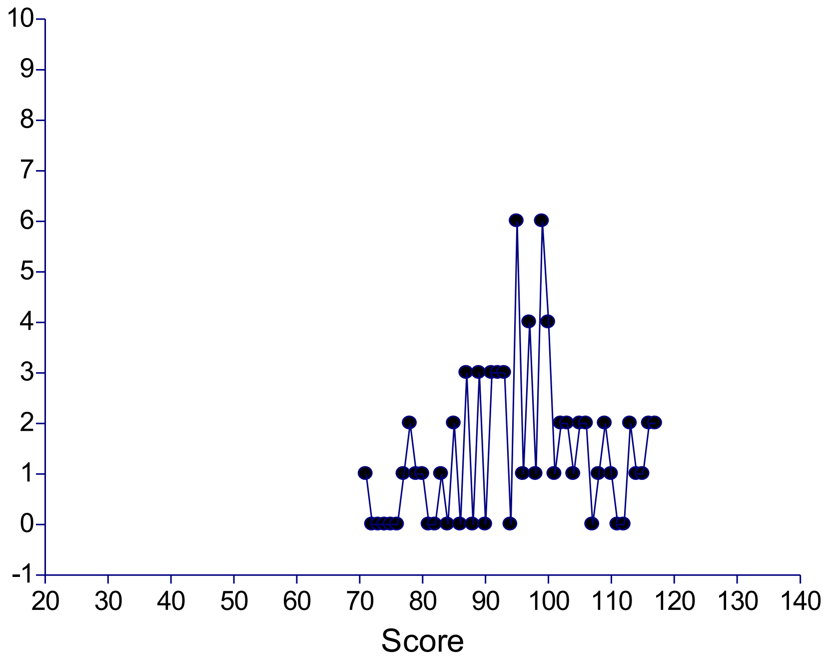

Figure B5b. Distribution for the WJ-III Brief Math Grade-Based Standard Scores, Fourth Grade

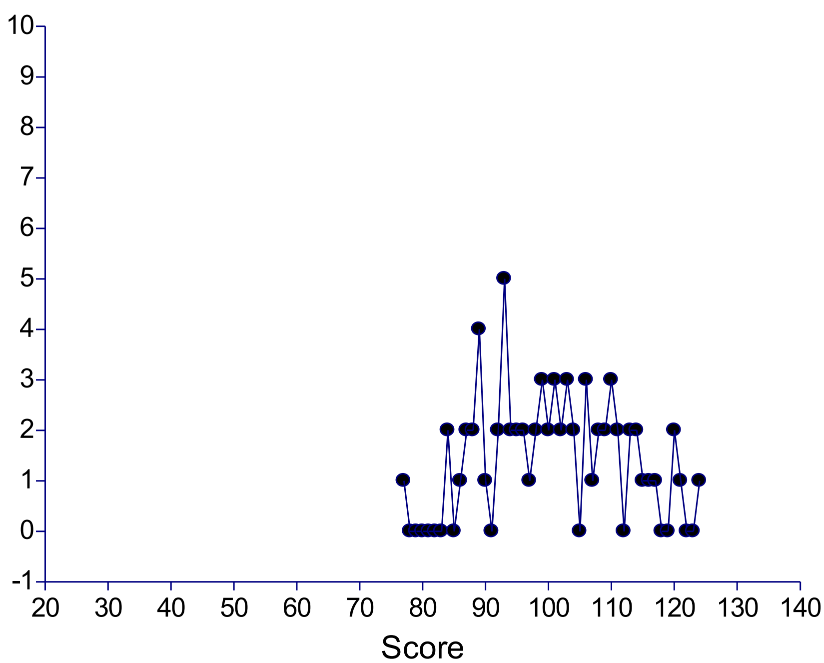

Figure B5c. Distribution for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Fourth Grade

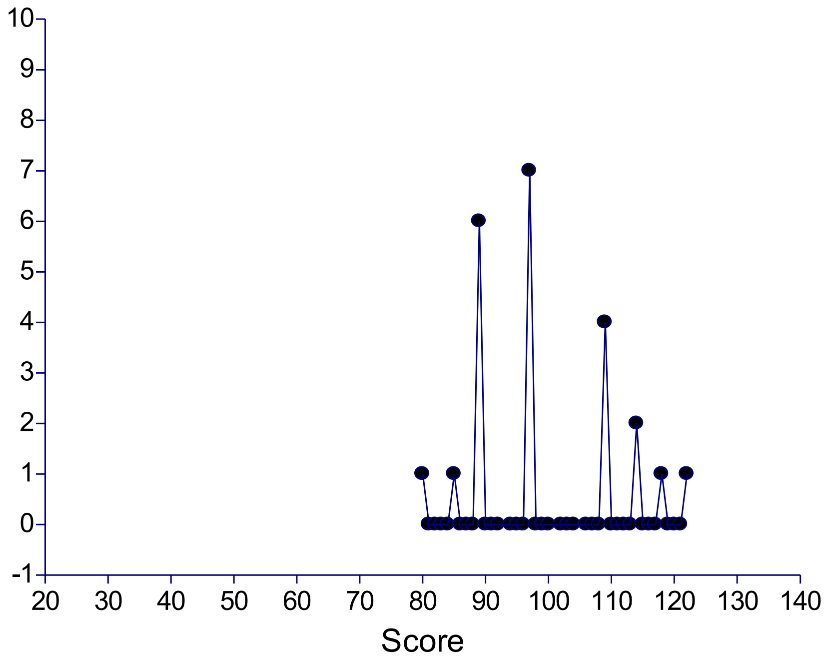

Figure B5d. Distribution for the WJ-III Calculation Grade-Based Standard Scores, Fourth Grade

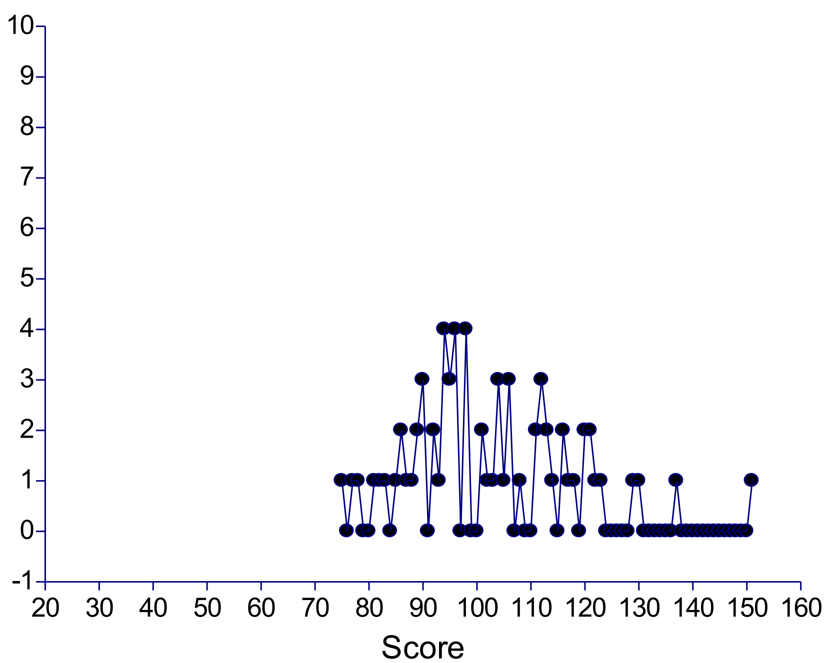

Figure B5e. Distribution for the WJ-III Math Fluency Grade-Based Standard Scores, Fourth Grade

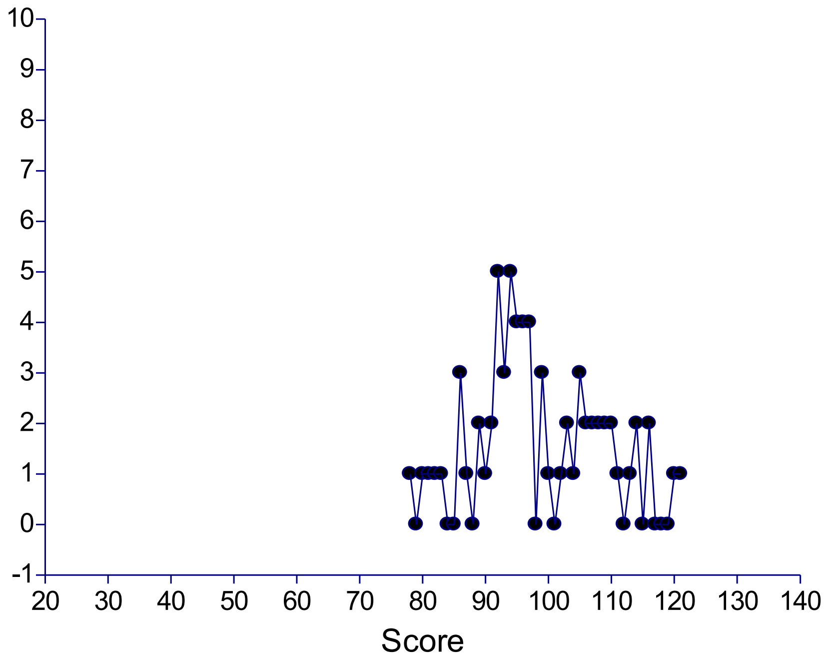

Figure B5f. Distribution for the WJ-III Math Reasoning Grade-Based Standard Scores, Fourth Grade

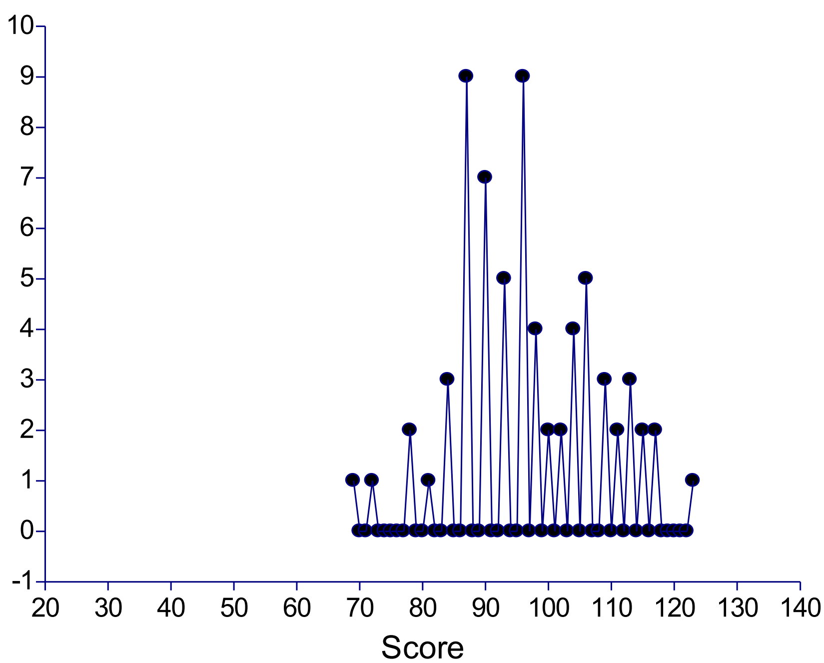

Figure B5g. Distribution for the WJ-III Applied Problems Grade-Based Standard Scores, Fourth Grade

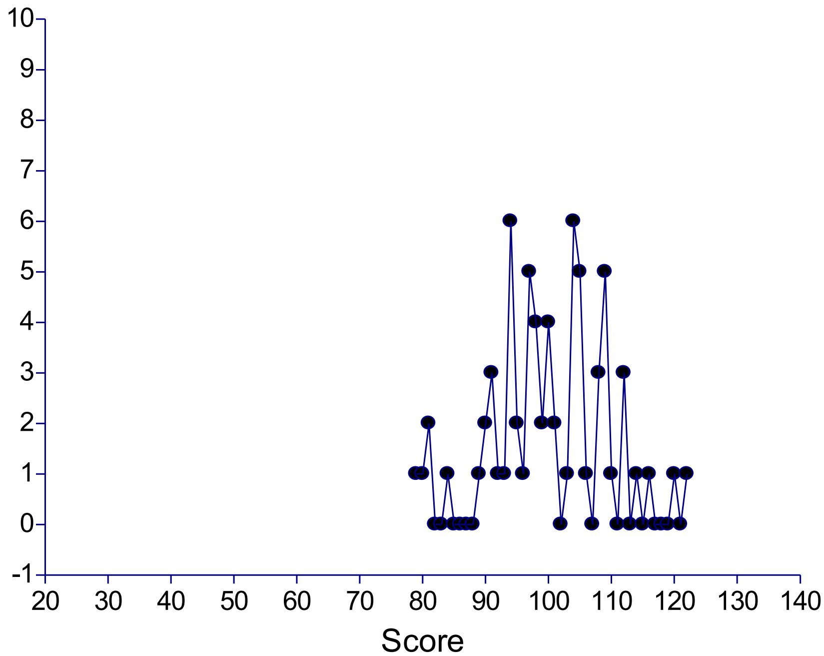

Figure B5h. Distribution for the WJ-III Quantitative Concepts Grade-Based Standard Scores, Fourth Grade

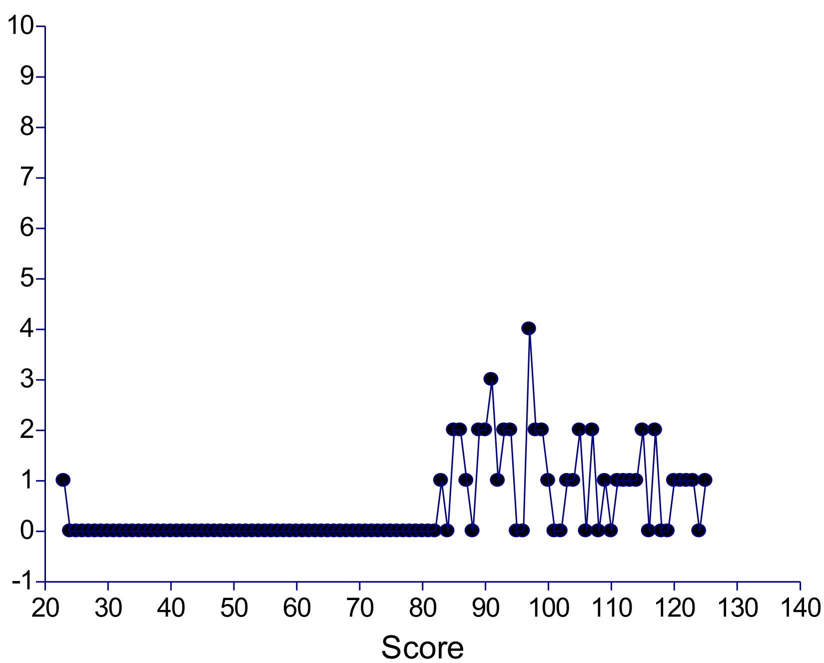

Figure B6a. Distribution for the WJ-III Broad Math Grade-Based Standard Scores, Fifth Grade

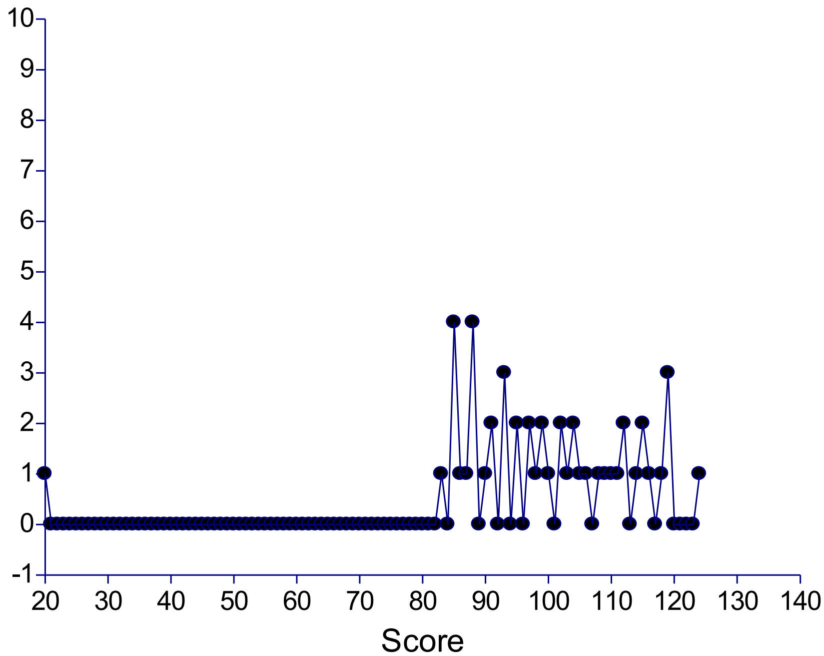

Figure B6b. Distribution for the WJ-III Brief Math Grade-Based Standard Scores, Fifth Grade

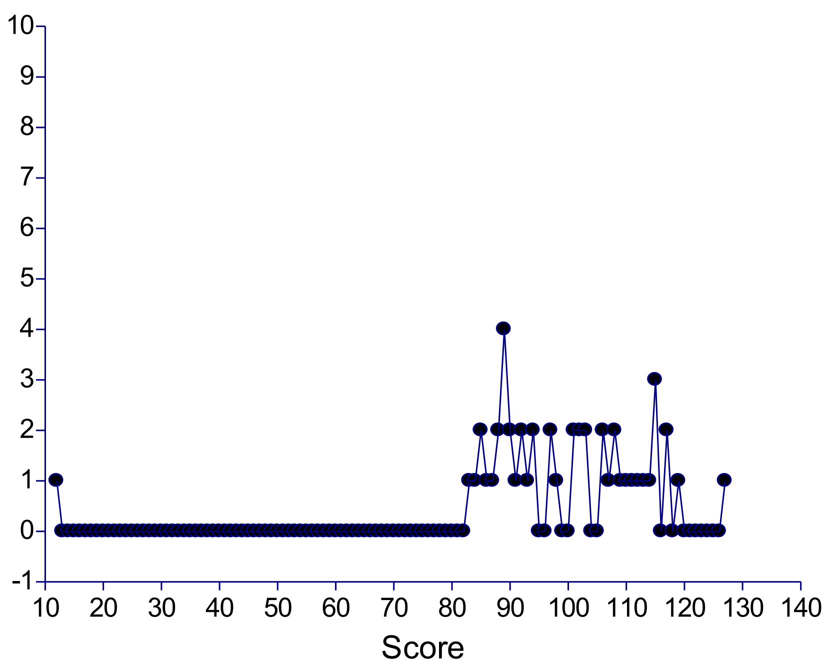

Figure B6c. Distribution for the WJ-III Math Calculation Skills Grade-Based Standard Scores, Fifth Grade

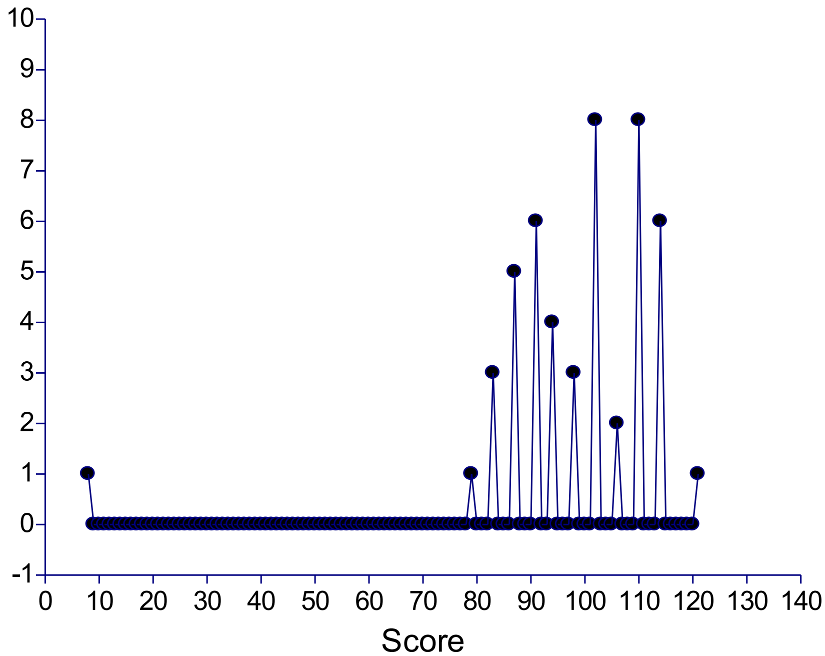

Figure B6d. Distribution for the Calculation Grade-Based Standard Scores, Fifth Grade

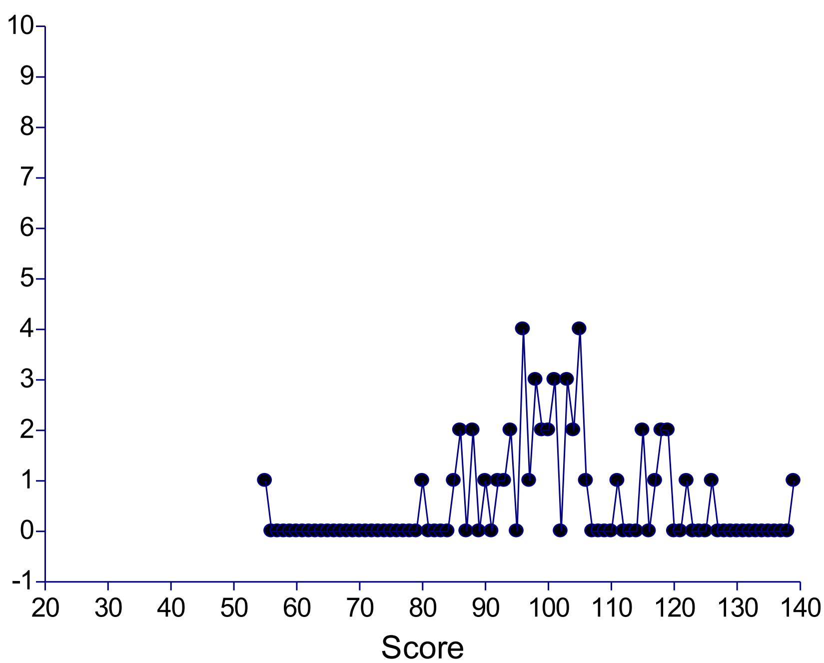

Figure B6e. Distribution for the Math Fluency Grade-Based Standard Scores, Fifth Grade

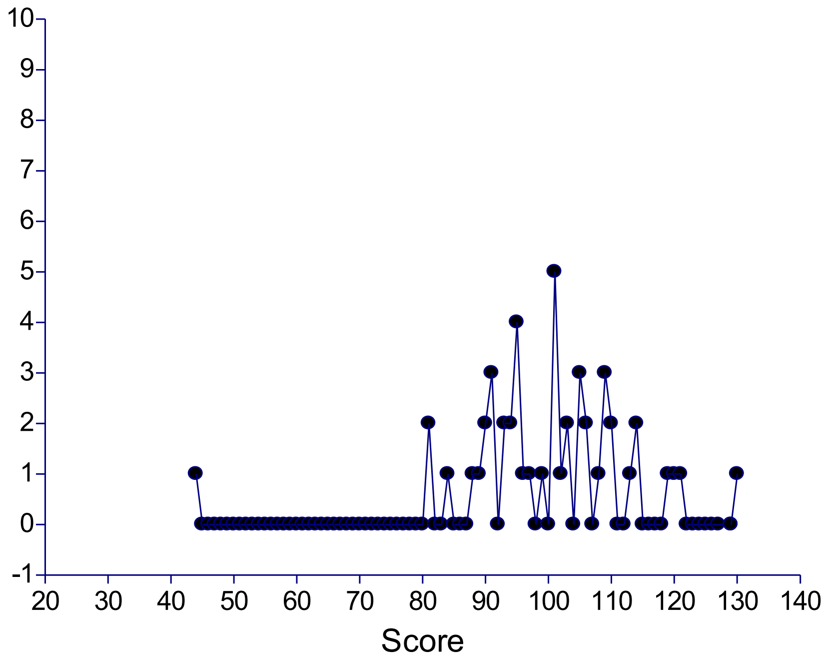

Figure B6f. Distribution for the Math Reasoning Grade-Based Standard Scores, Fifth Grade

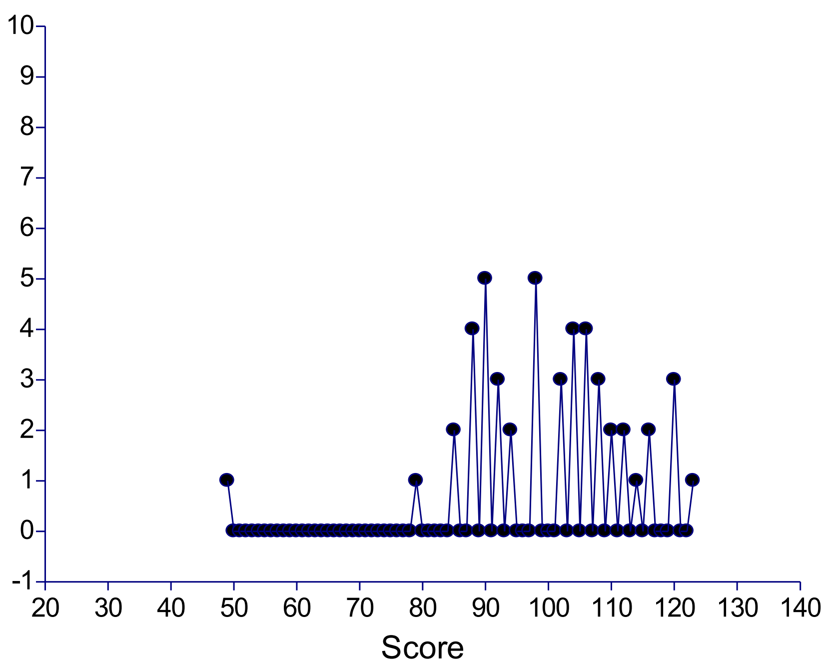

Figure B6g. Distribution for the Applied Problems Grade-Based Standard Scores, Fifth Grade

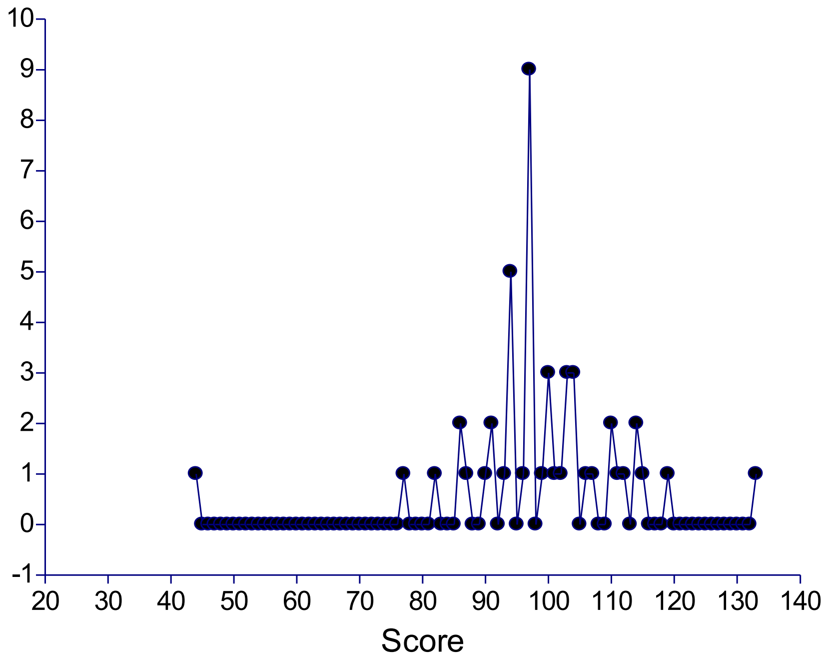

Figure B6h. Distribution for the Quantitative Concepts Grade-Based Standard Scores, Fifth Grade

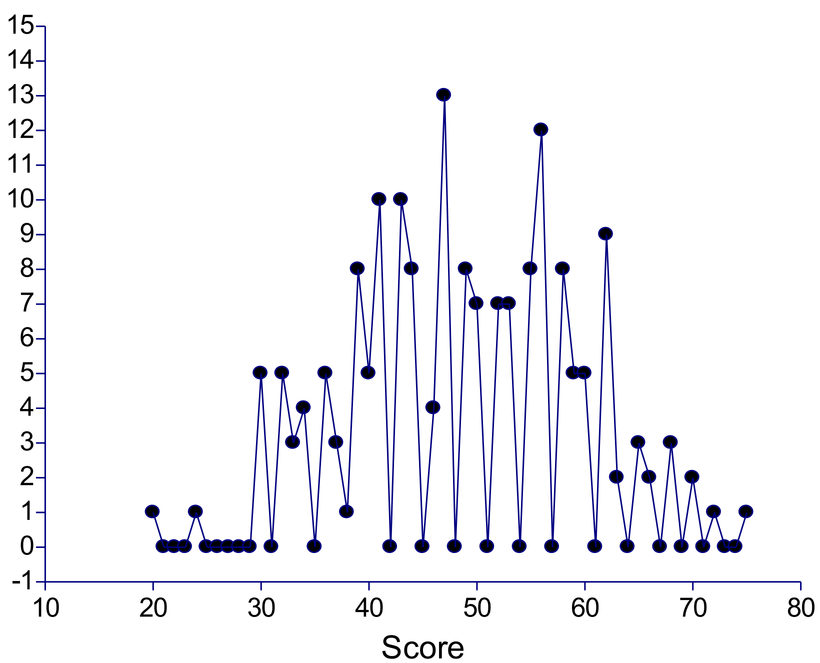

Figure B7a. Distribution for the SMALSI Study Strategies Standard T Scores, Full Sample

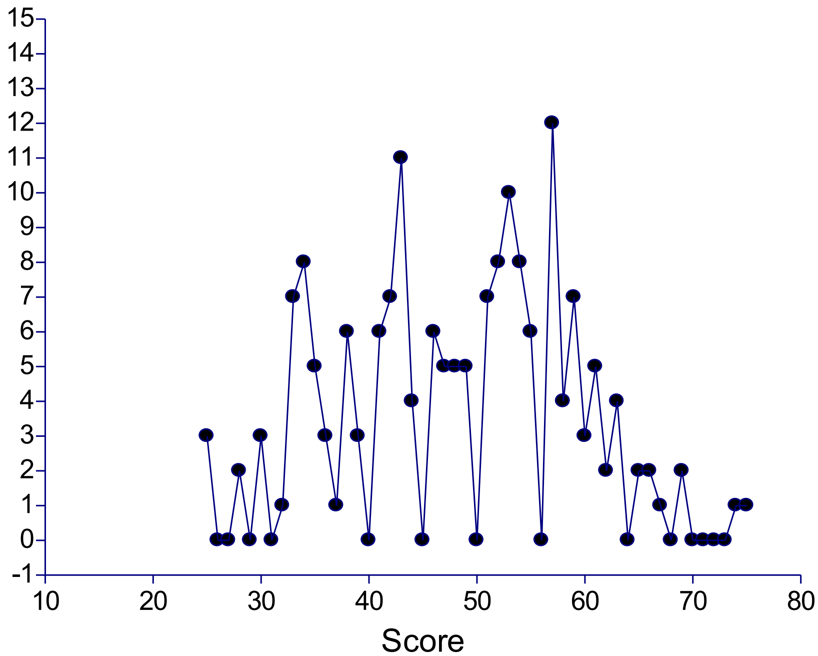

Figure B7b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Full Sample

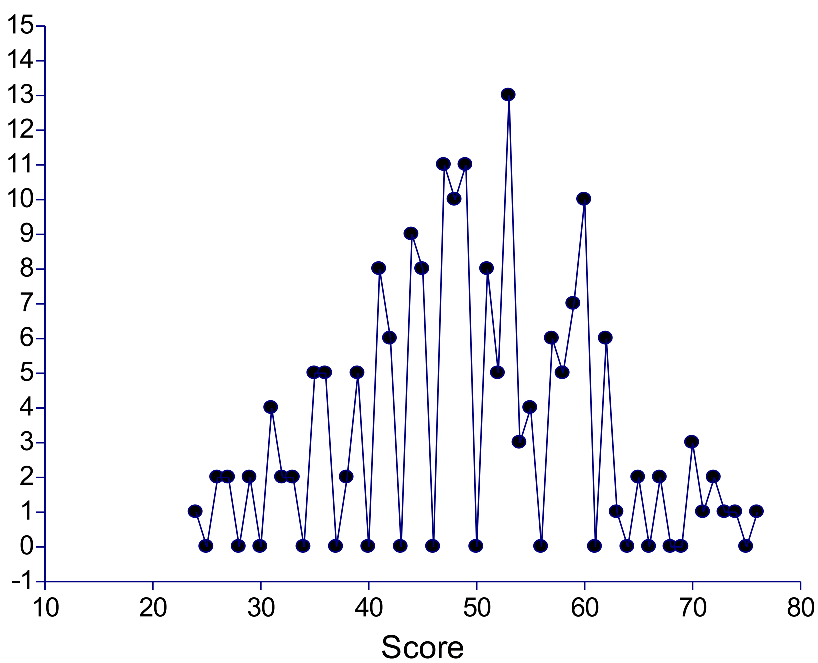

Figure B7c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Full Sample

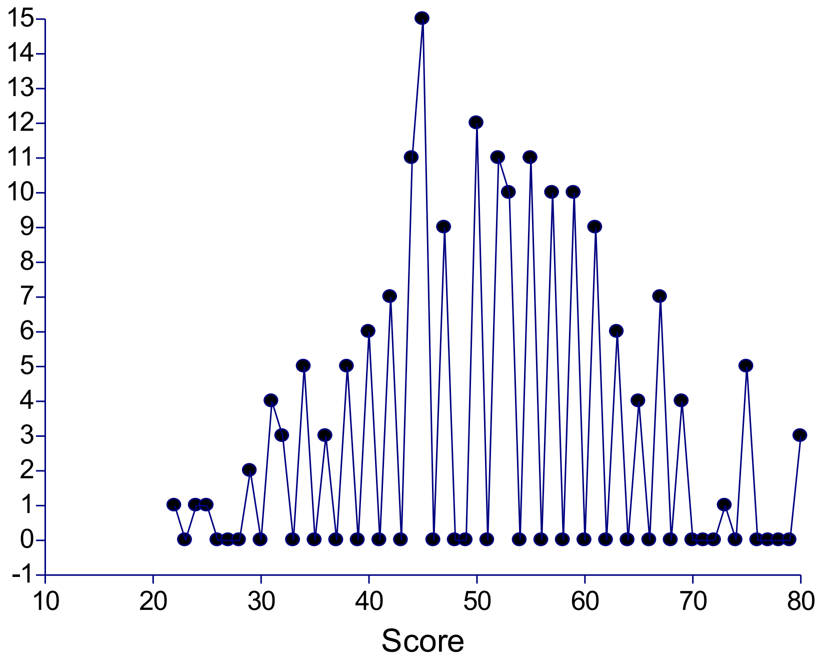

Figure B7d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Full Sample

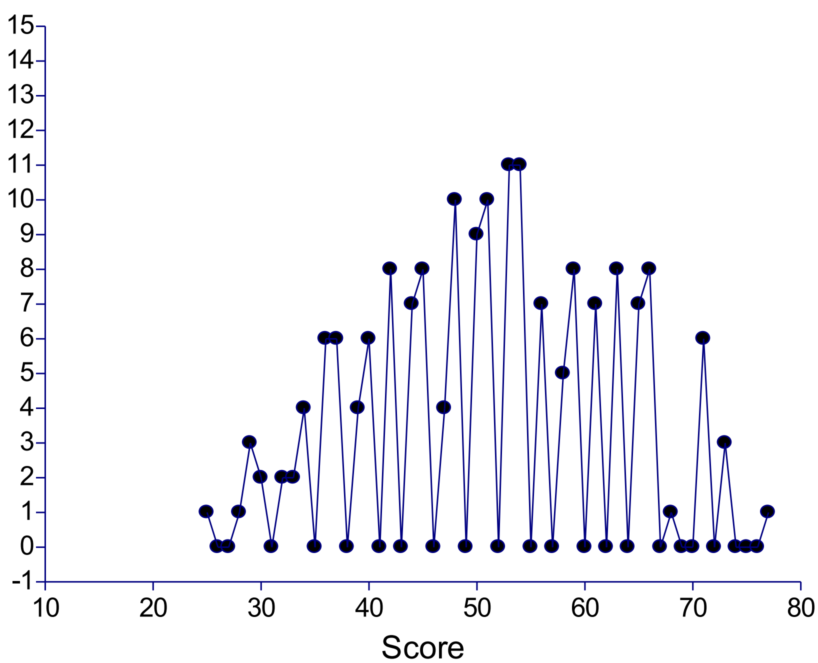

Figure B7e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Full Sample

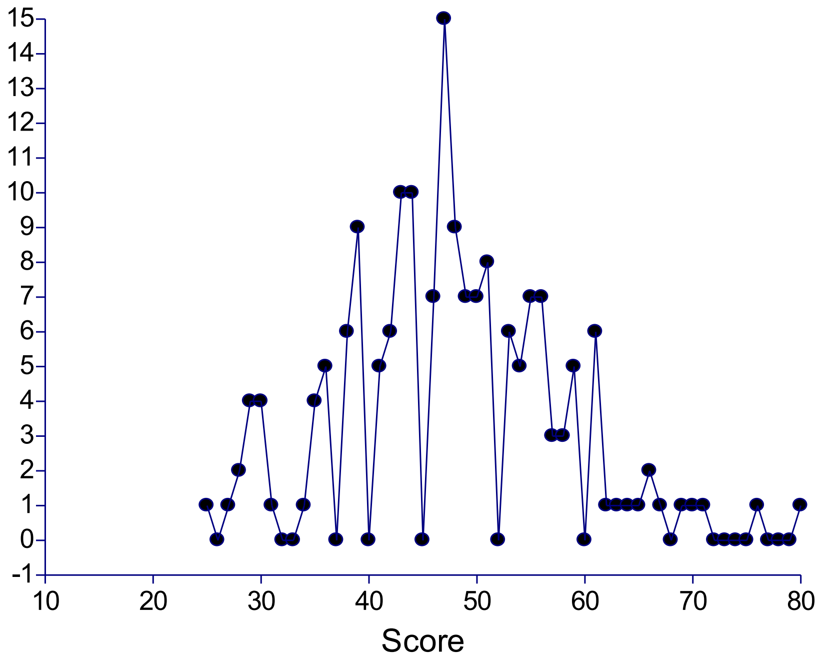

Figure B7f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Full Sample

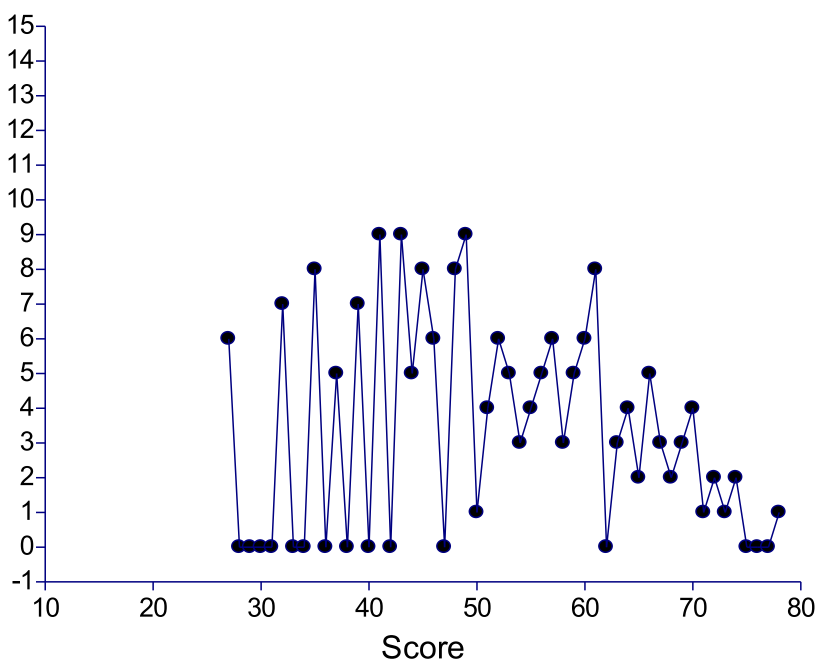

Figure B7g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Full Sample

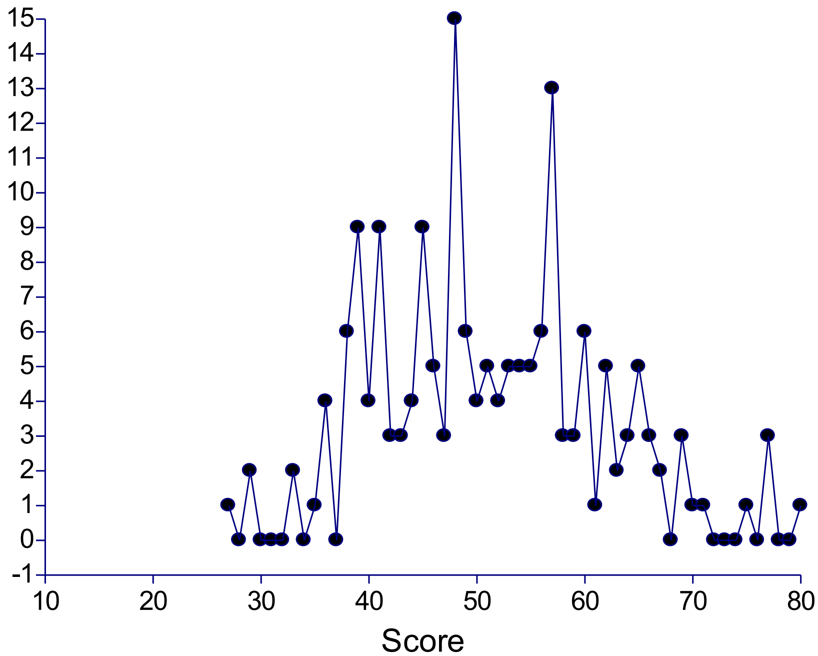

Figure B7h. Distribution for the SMALSI Test Anxiety Standard T Scores, Full Sample

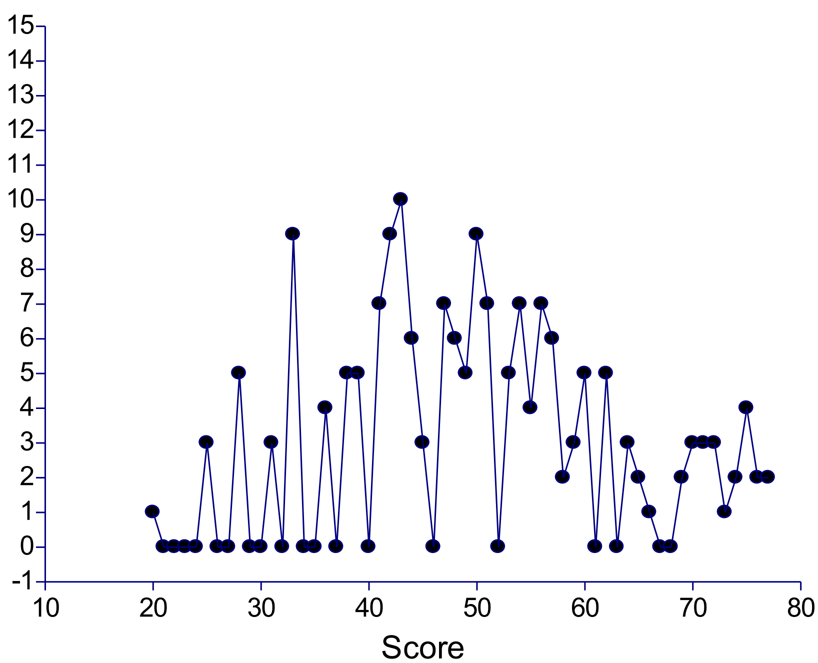

Figure B7i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Full Sample

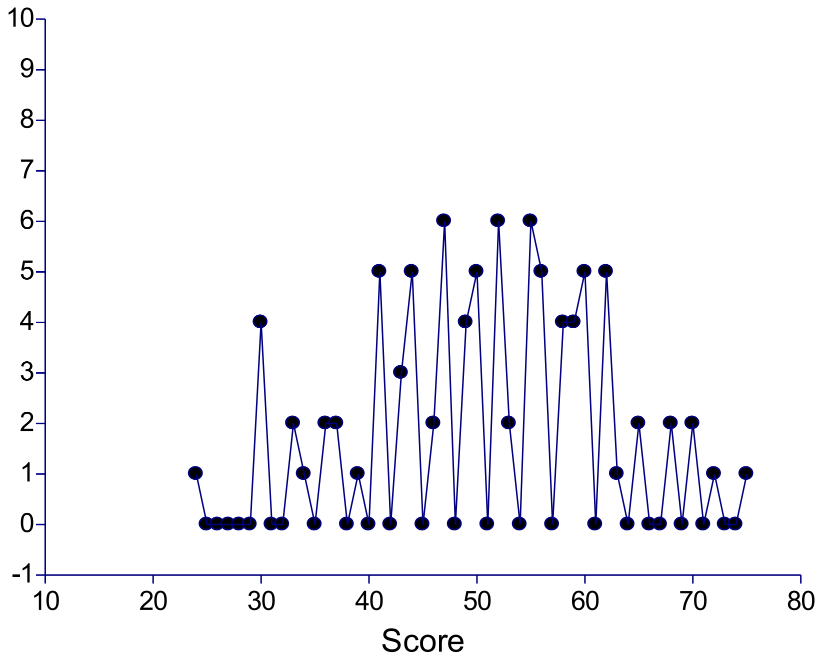

Figure B8a. Distribution for the SMALSI Study Strategies Standard T Scores, Female Participants

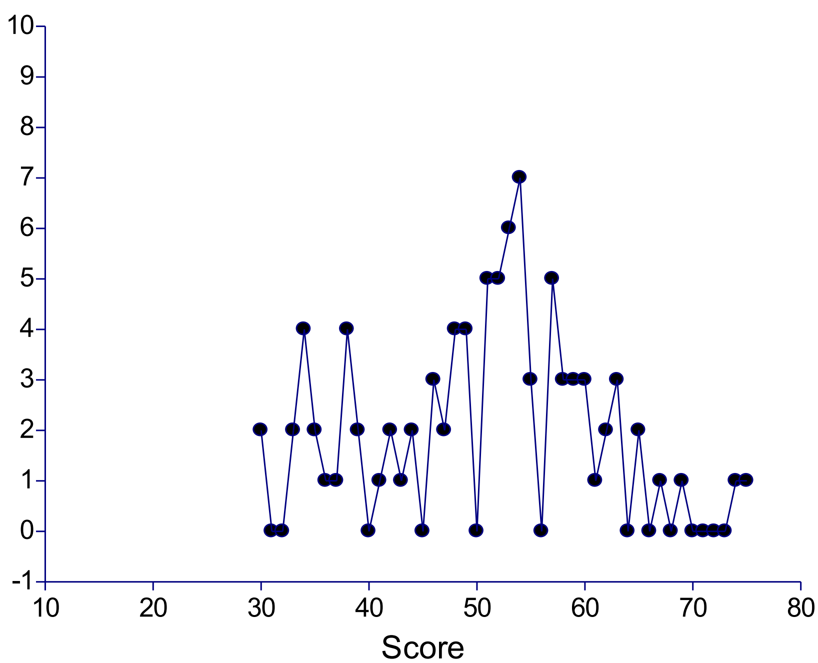

Figure B8b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Female Participants

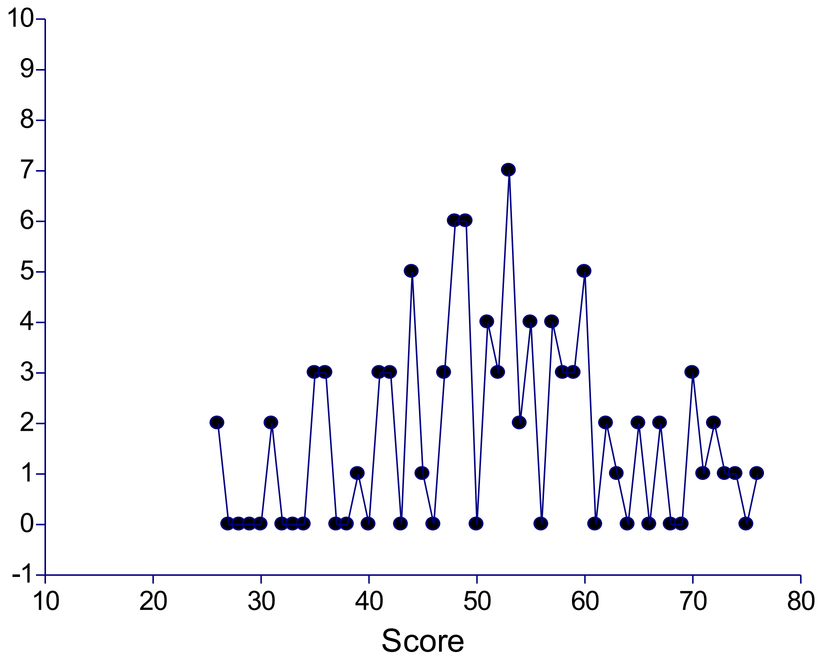

Figure B8c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Female Participants

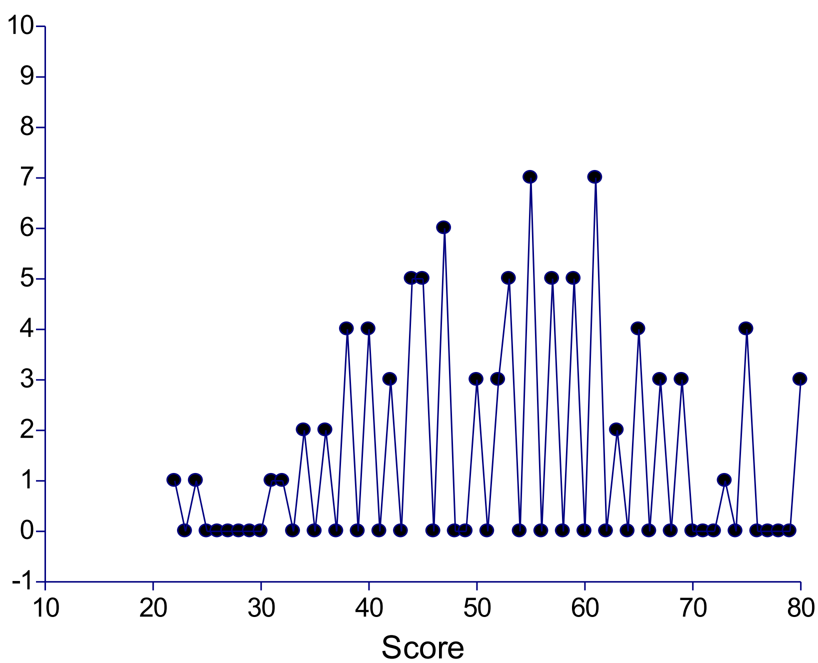

Figure B8d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Female Participants

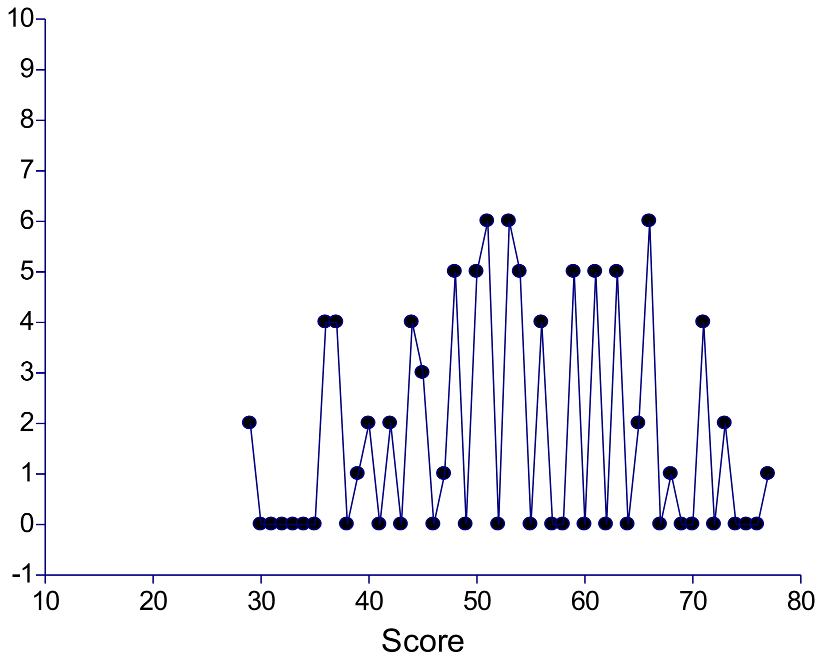

Figure B8e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Female Participants

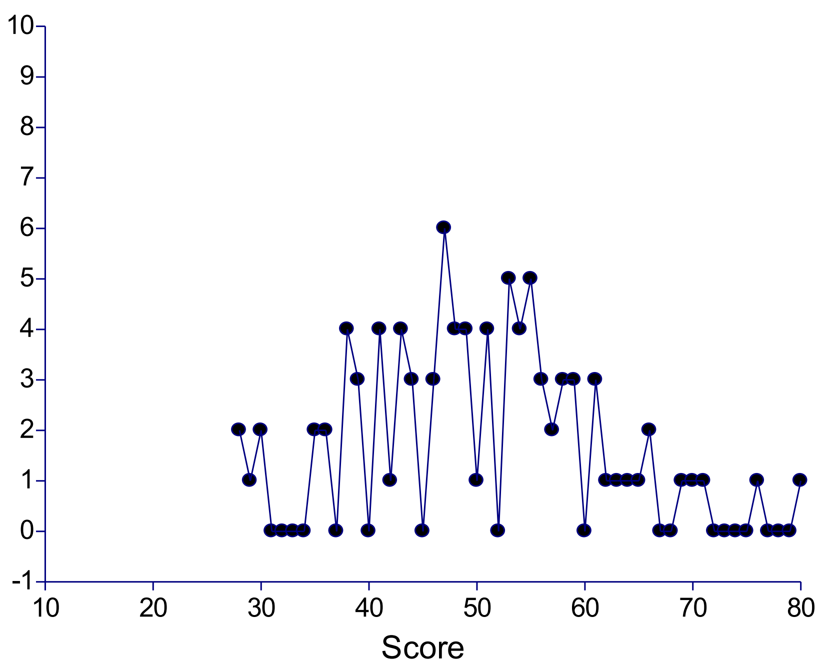

Figure B8f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Female Participants

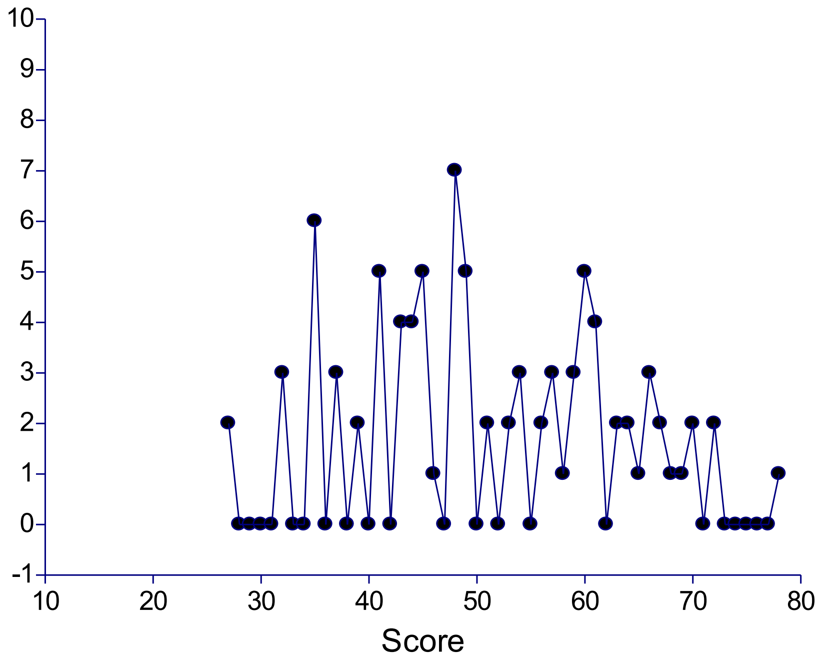

Figure B8g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Female Participants

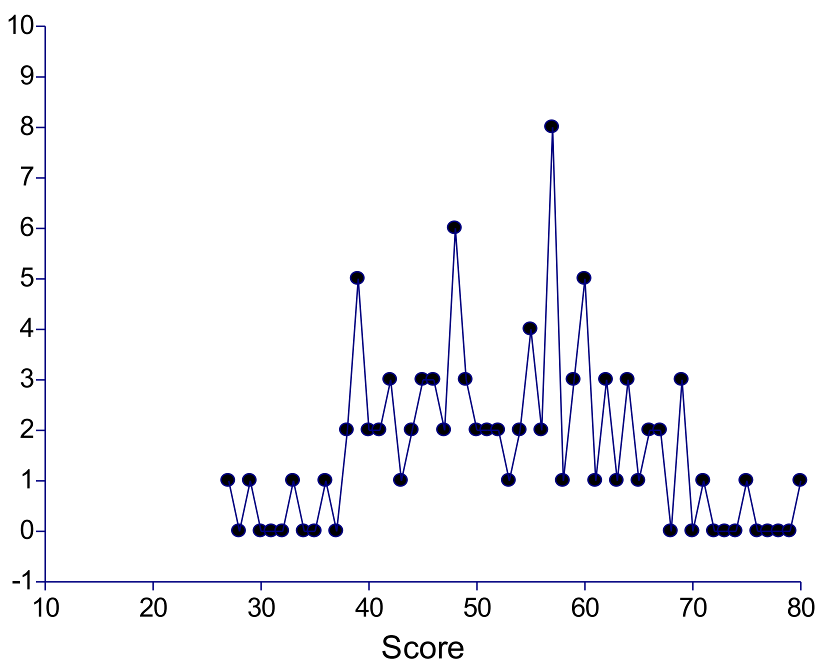

Figure B8h. Distribution for the SMALSI Test Anxiety Standard T Scores, Female Participants

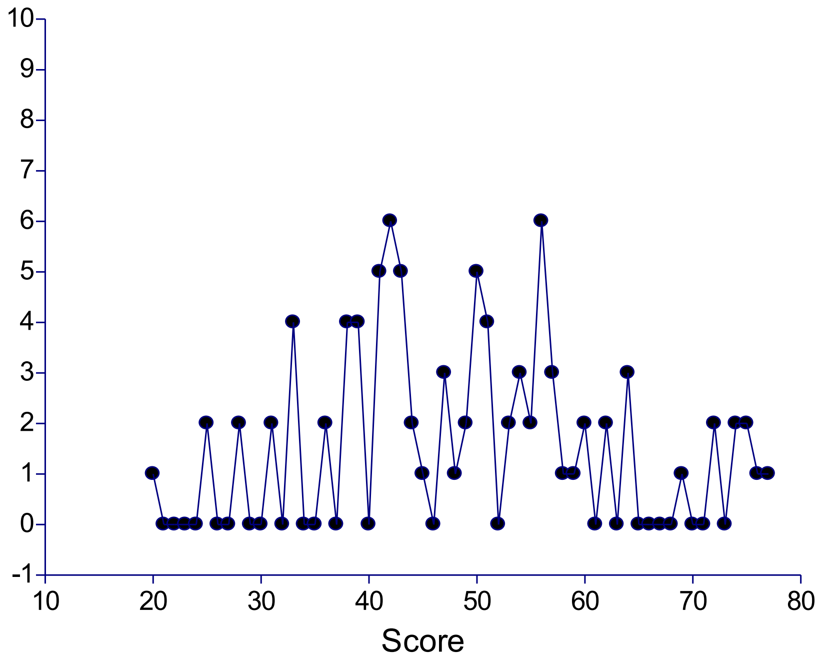

Figure B8i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Female Participants

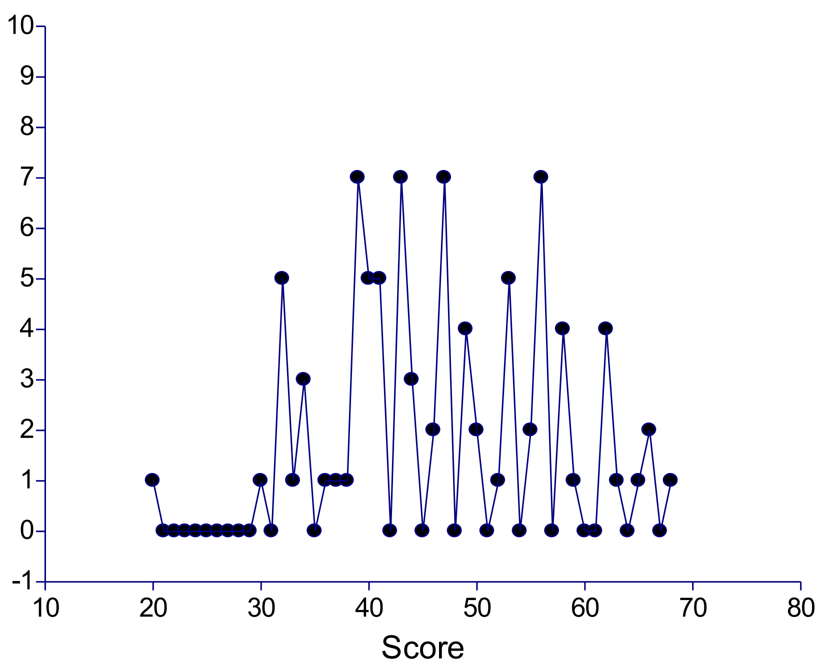

Figure B9a. Distribution for the SMALSI Study Strategies Standard T Scores, Male Participants

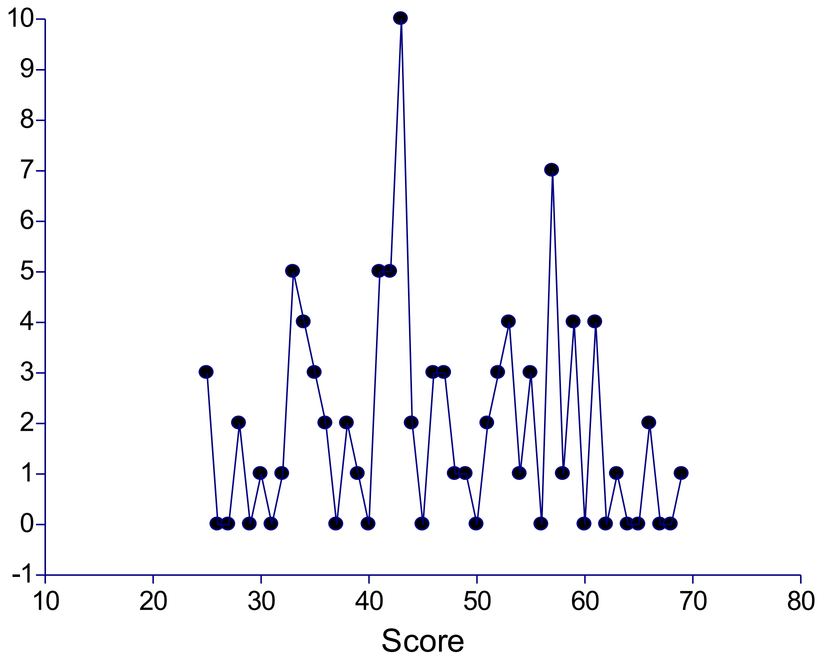

Figure B9b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Male Participants

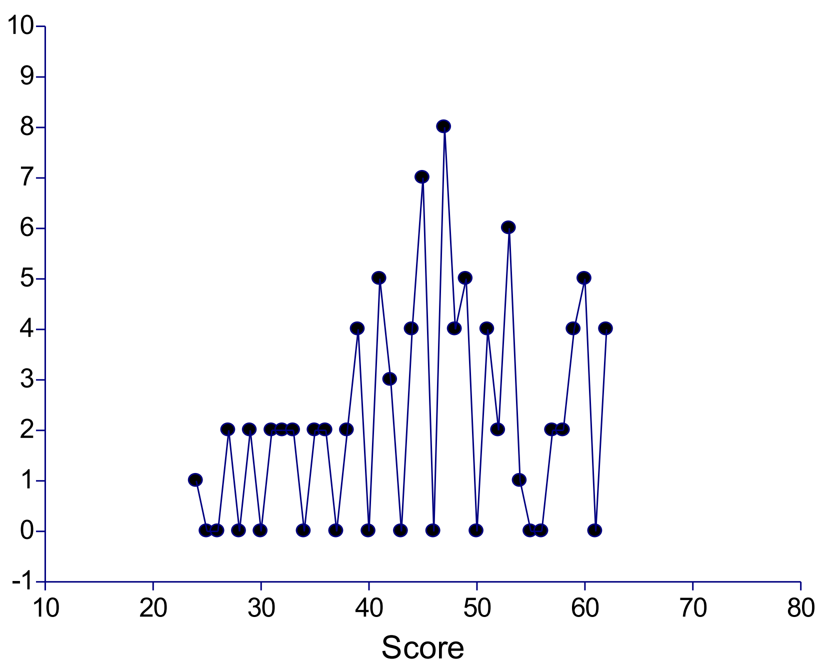

Figure B9c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Male Participants

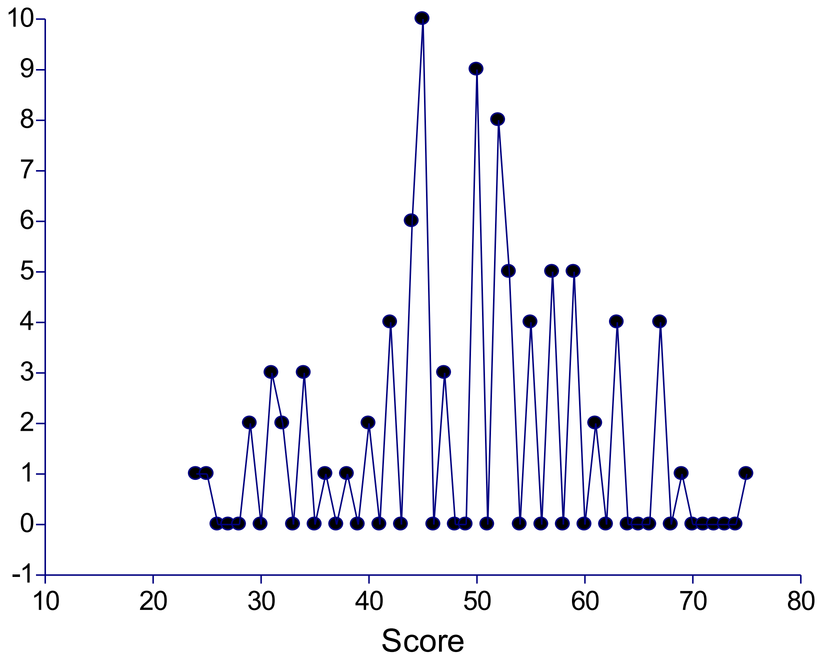

Figure B9d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Male Participants

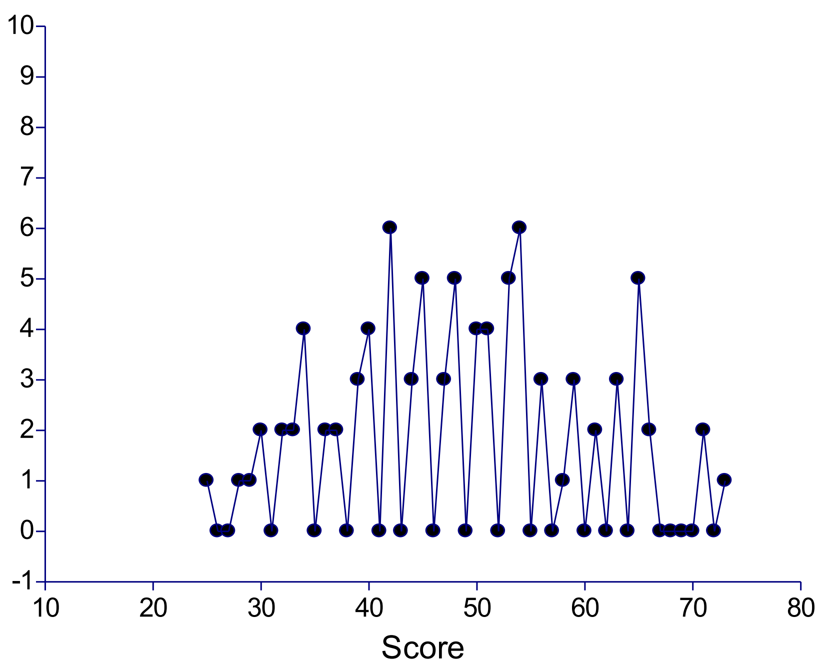

Figure B9e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Male Participants

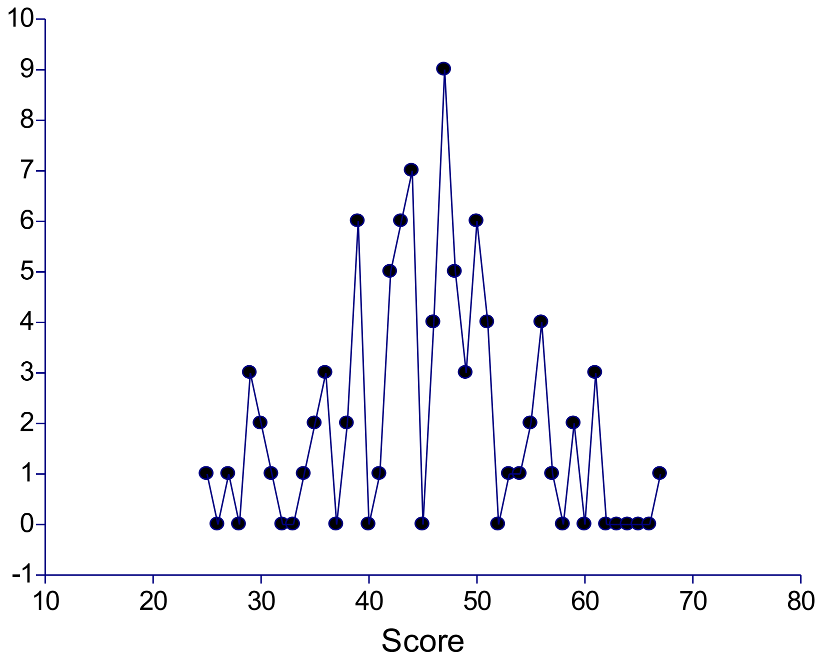

Figure B9f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Male Participants

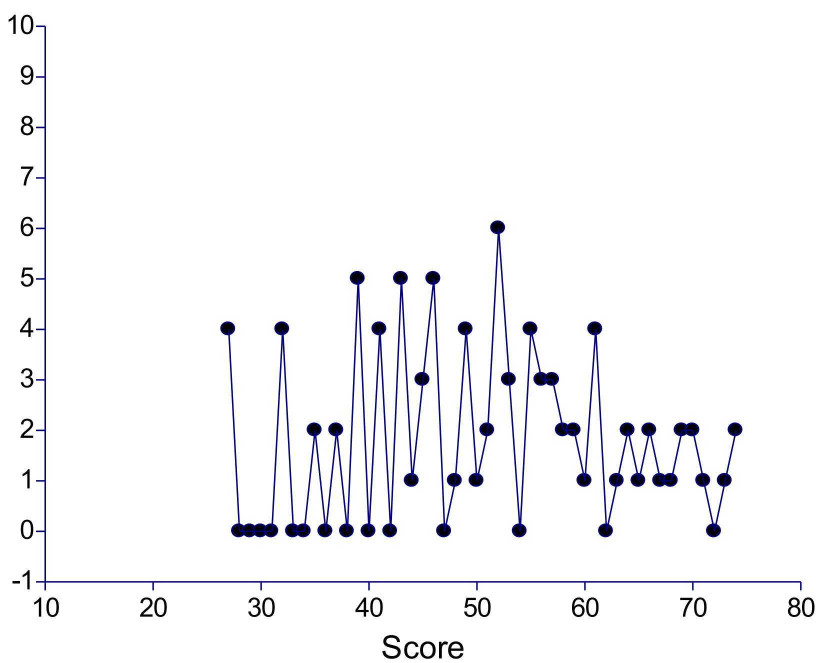

Figure B9g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Male Participants

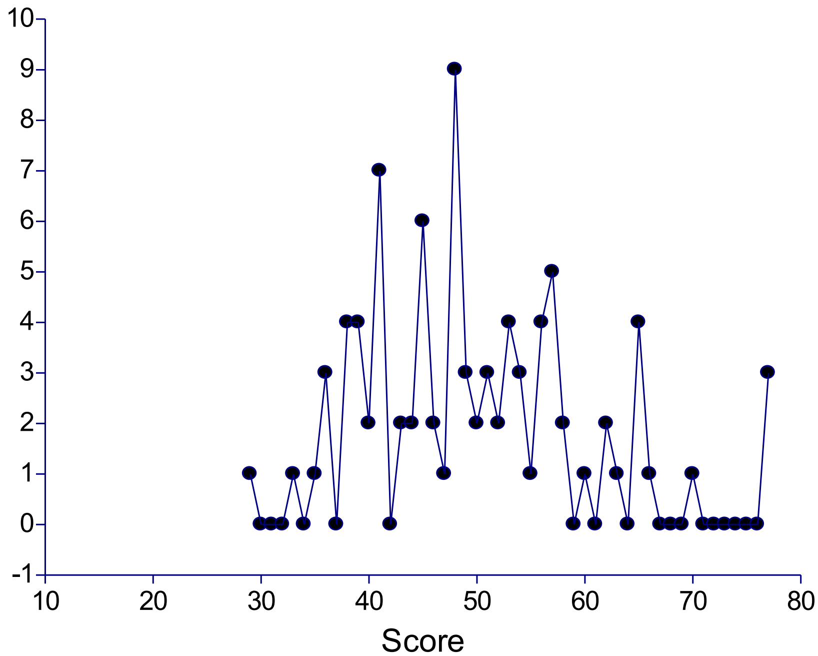

Figure B9h. Distribution for the SMALSI Test Anxiety Standard T Scores, Male Participants

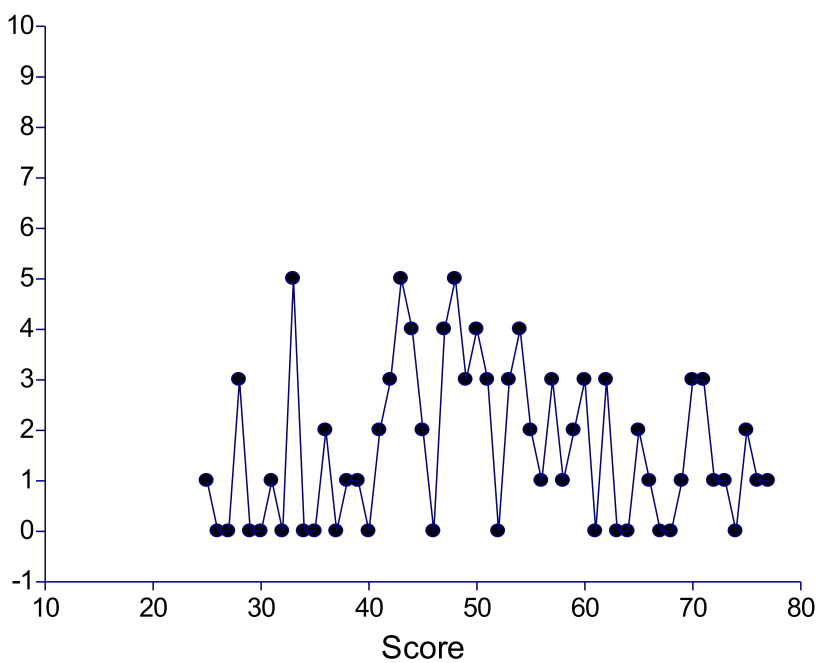

Figure B9i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Male Participants

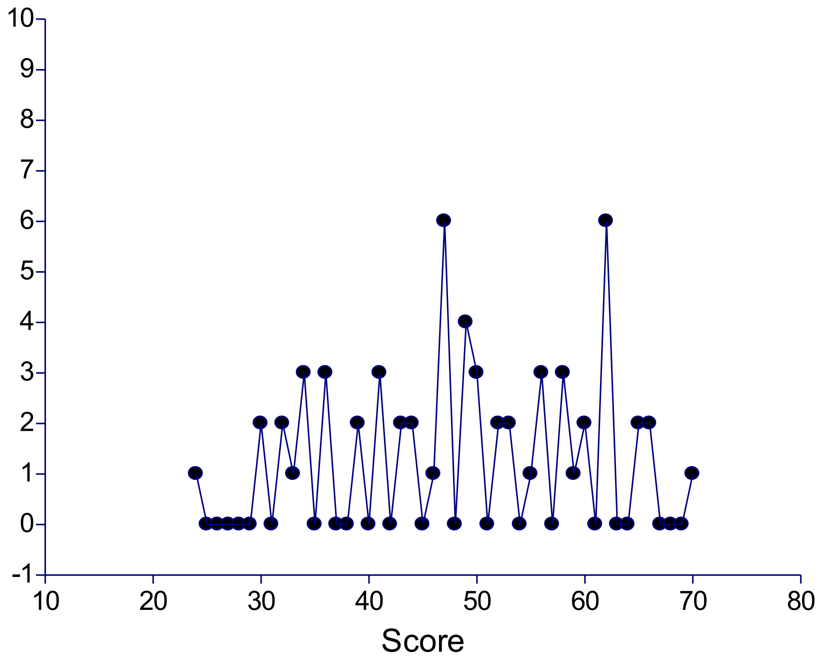

Figure B10a. Distribution for the SMALSI Study Strategies Standard T Scores, Third Grade

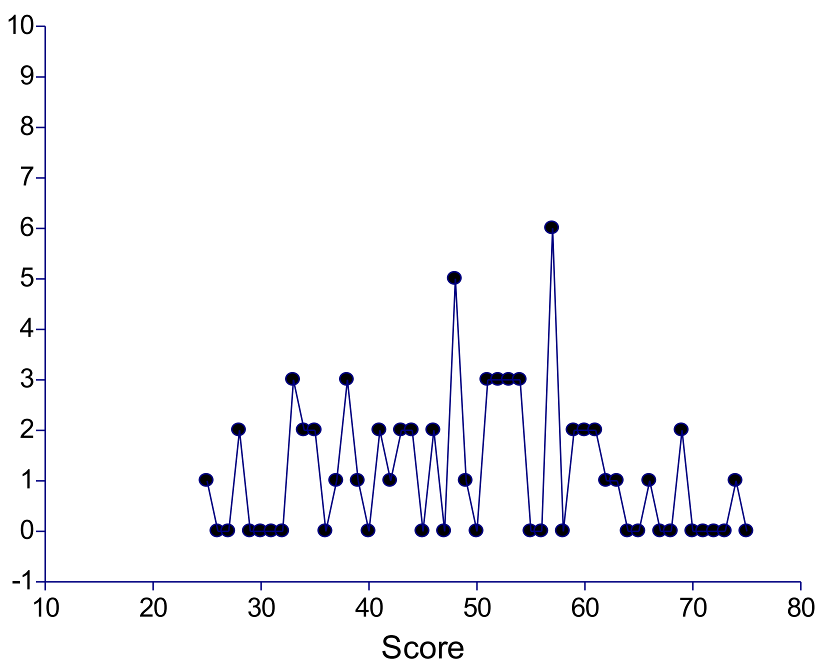

Figure B10b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Third Grade

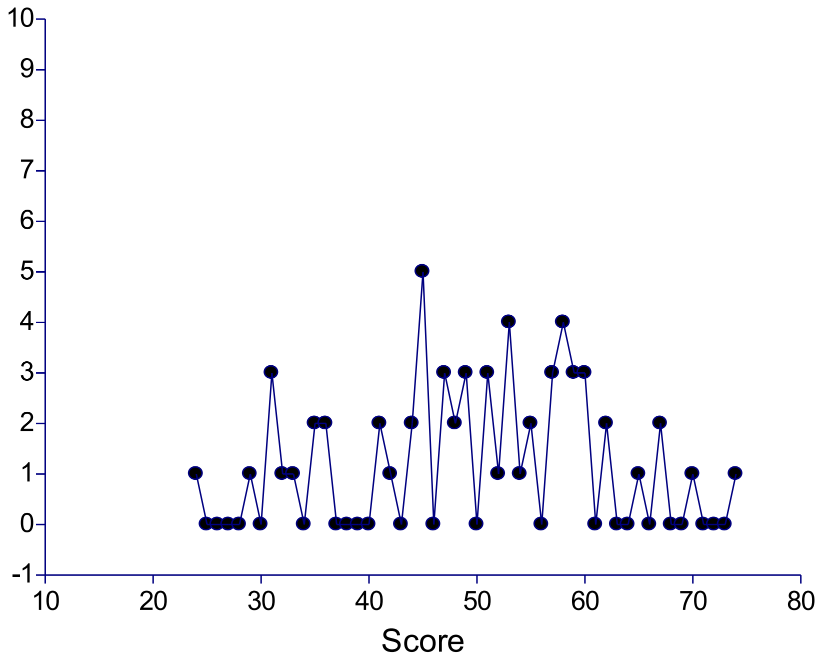

Figure B10c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Third Grade

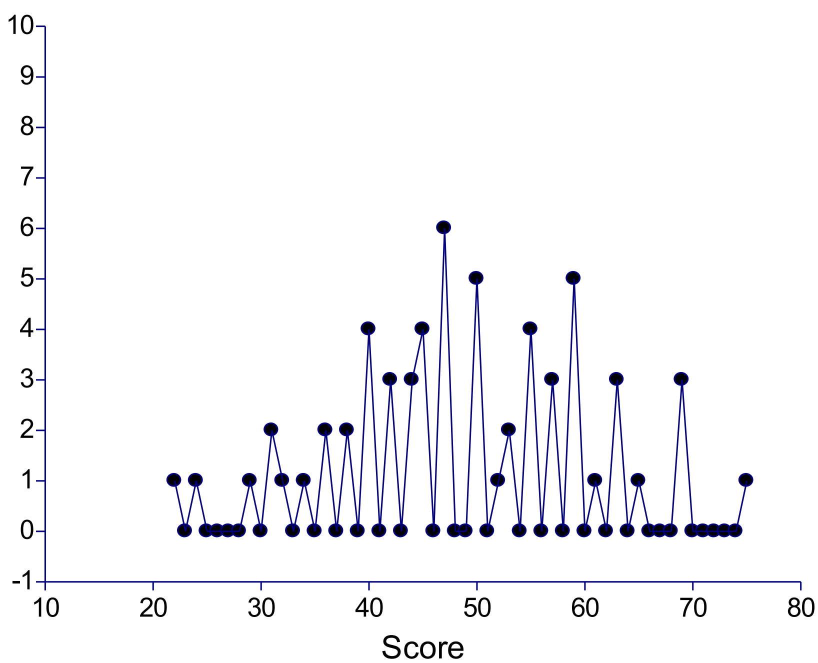

Figure B10d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Third Grade

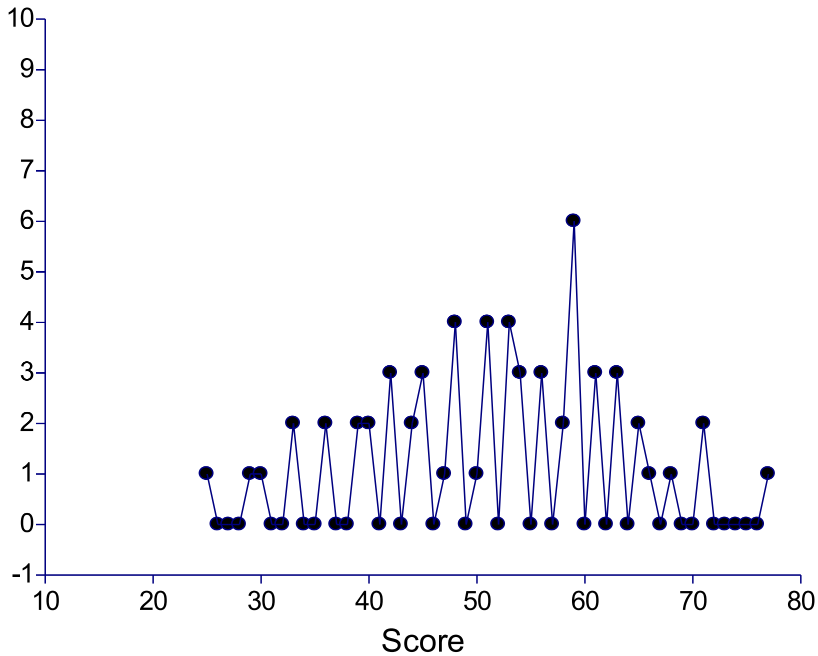

Figure B10e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Third Grade

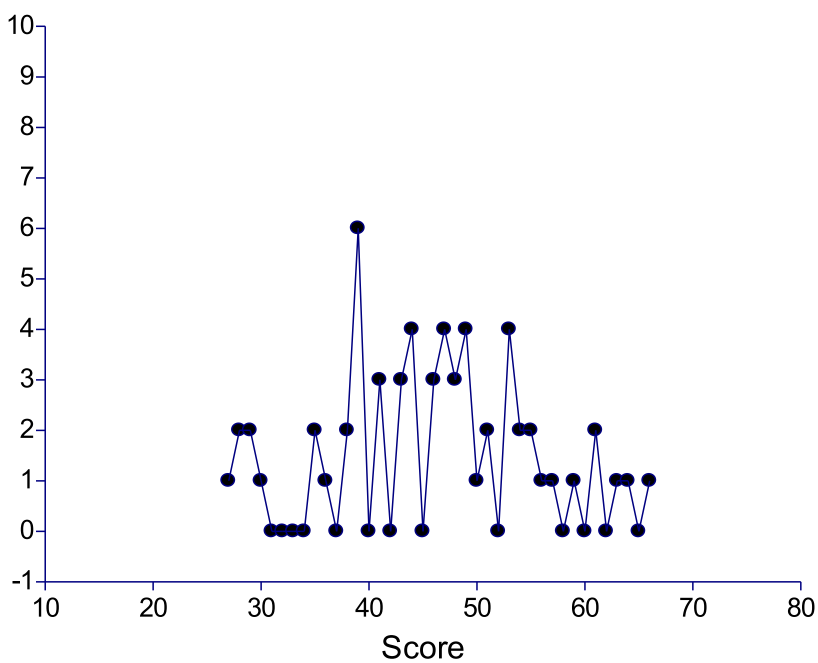

Figure B10f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Third Grade

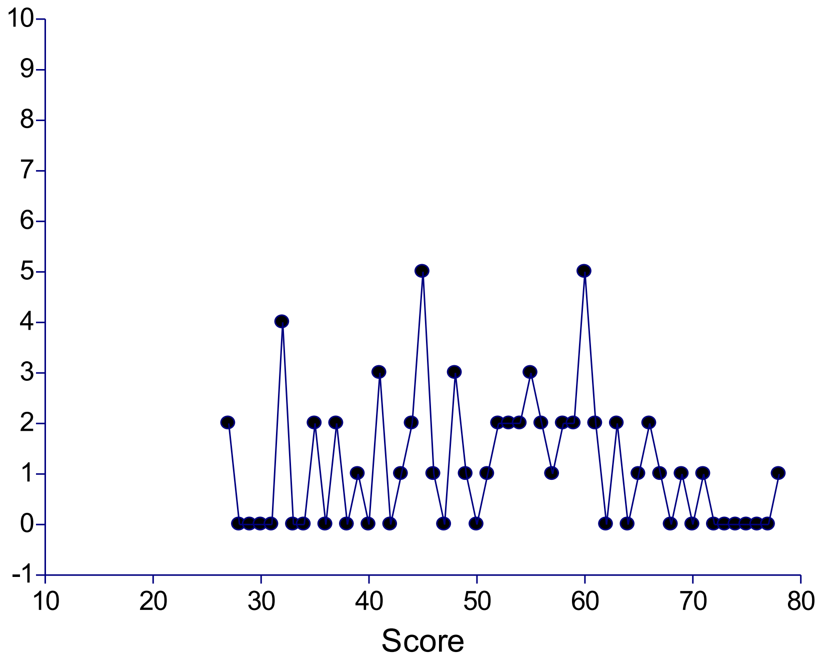

Figure B10g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Third Grade

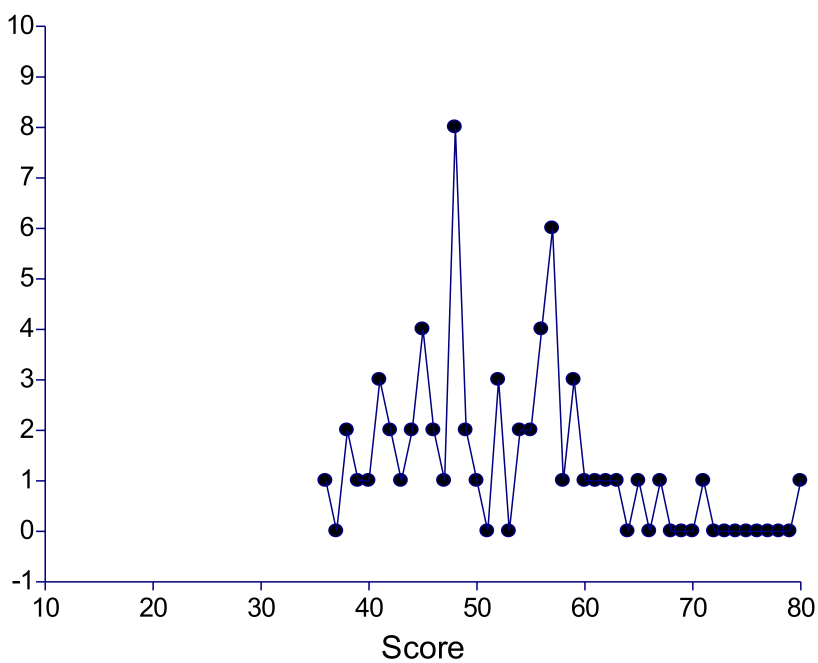

Figure B10h. Distribution for the SMALSI Test Anxiety Standard T Scores, Third Grade

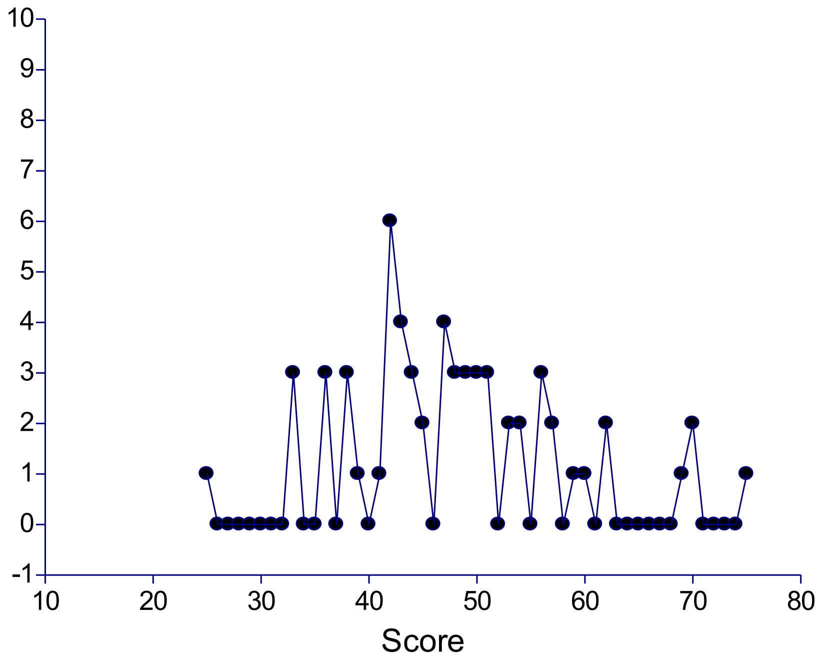

Figure B10i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Third Grade

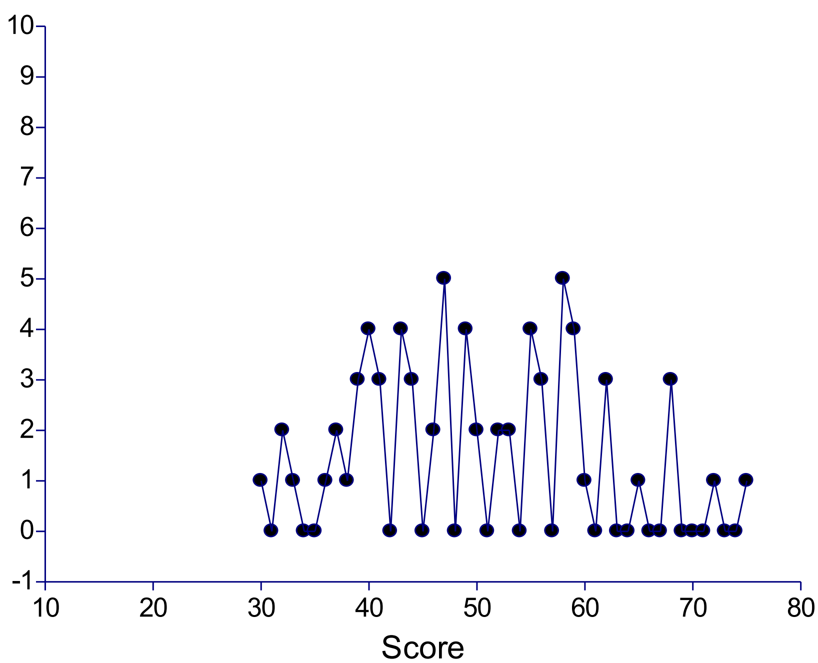

Figure B11a. Distribution for the SMALSI Study Strategies Standard T Scores, Fourth Grade

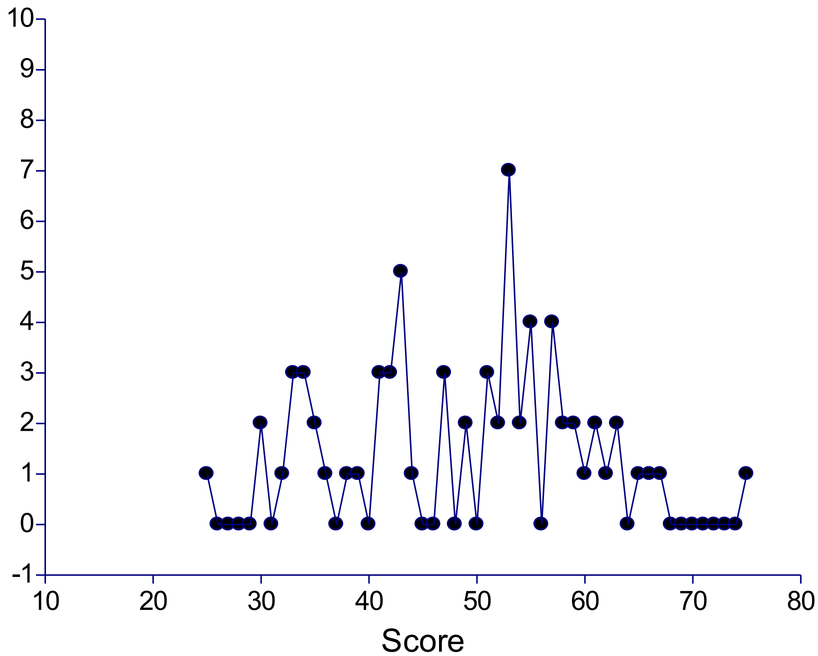

Figure B11b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Fourth Grade

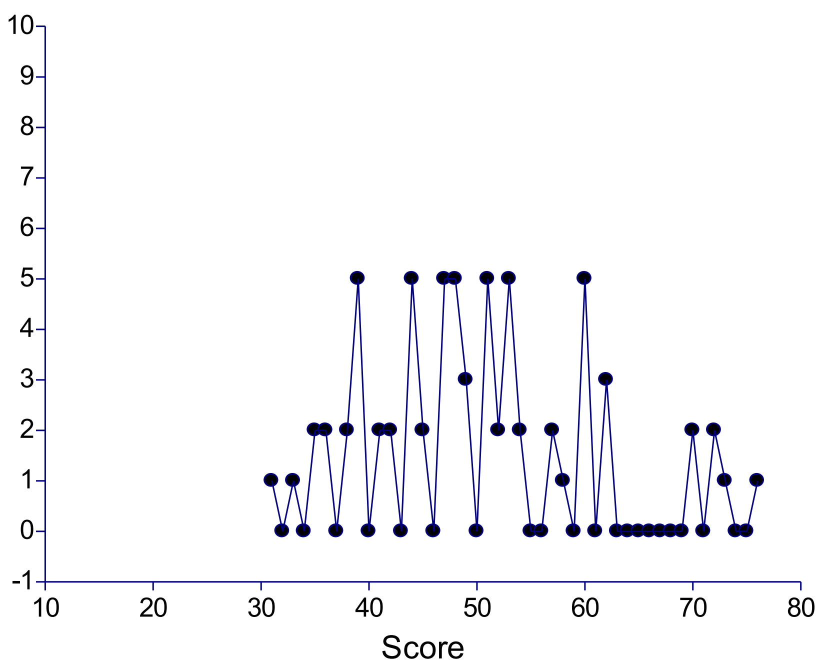

Figure B11c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Fourth Grade

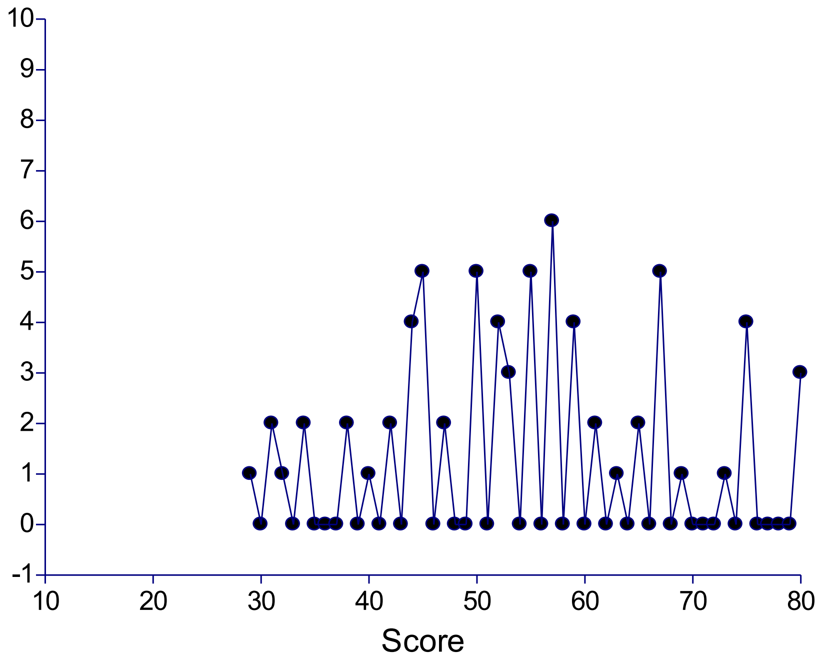

Figure B11d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Fourth Grade

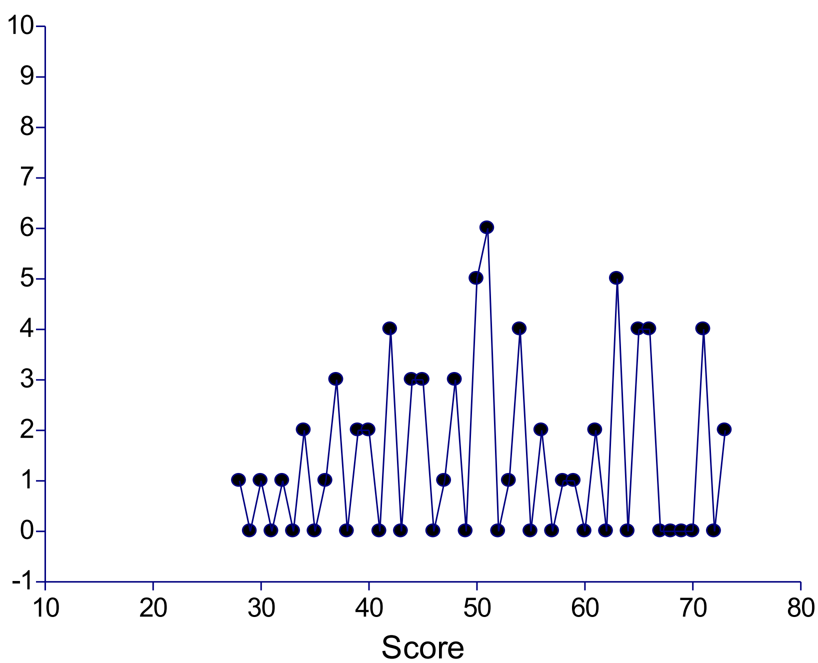

Figure B11e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Fourth Grade

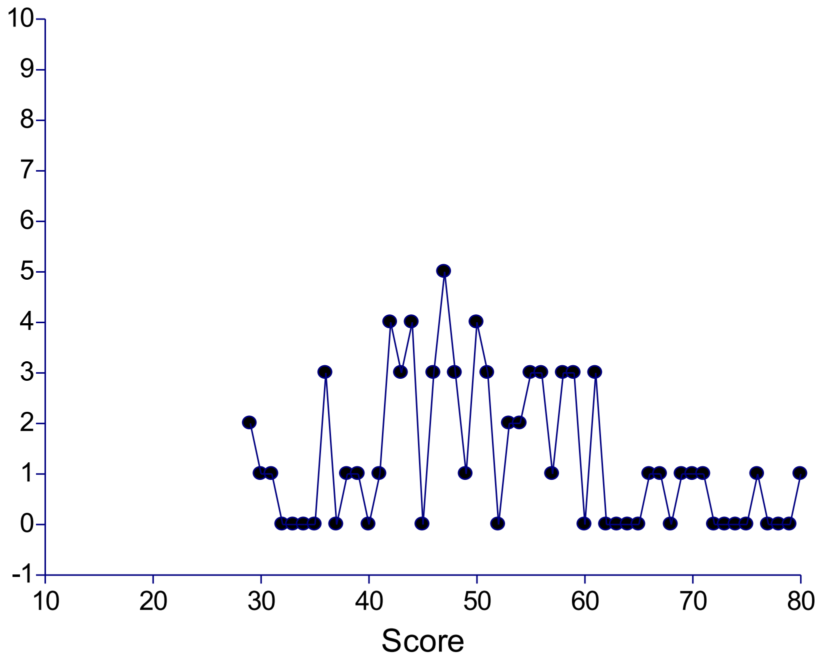

Figure B11f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Fourth Grade

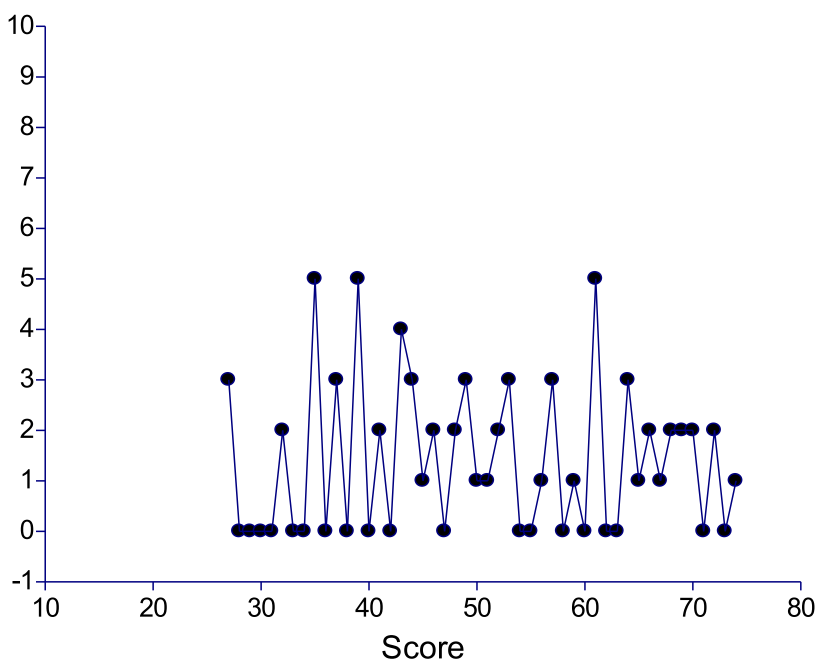

Figure B11g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Fourth Grade

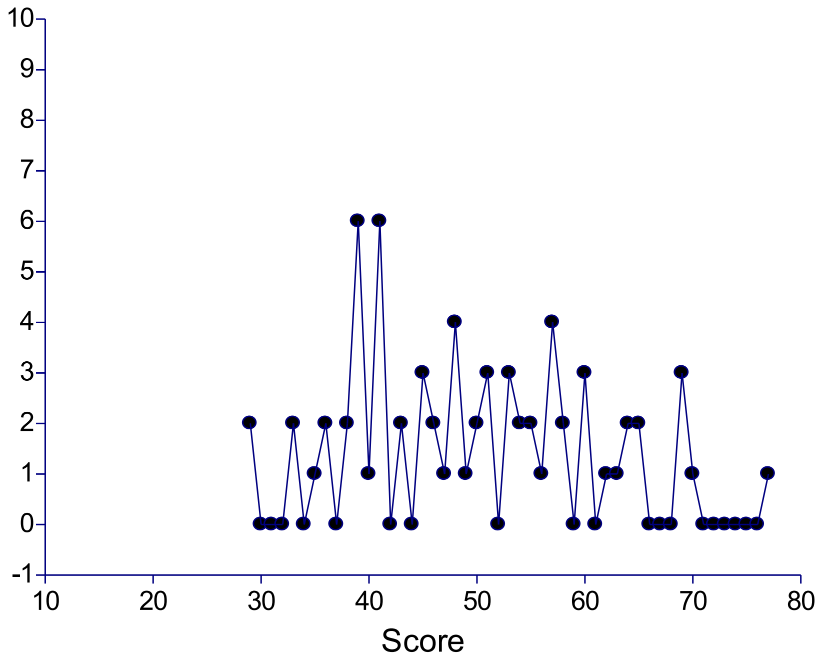

Figure B11h. Distribution for the SMALSI Test Anxiety Standard T Scores, Fourth Grade

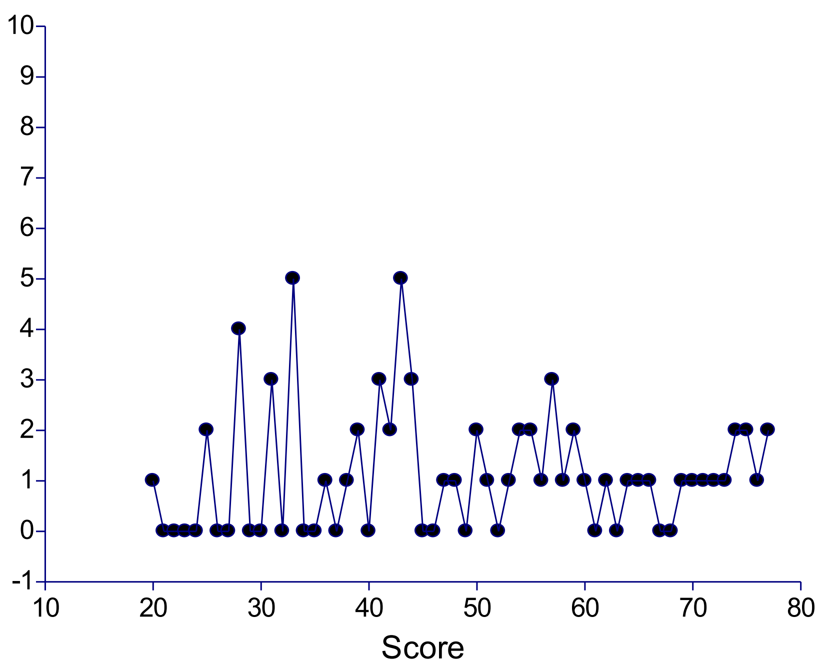

Figure B11i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Fourth Grade

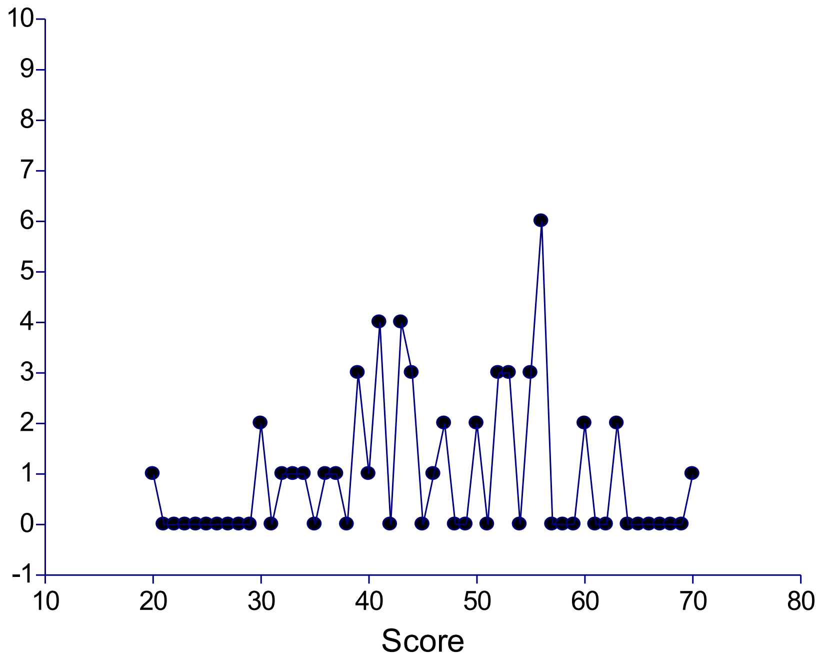

Figure B12a. Distribution for the SMALSI Study Strategies Standard T Scores, Fifth Grade

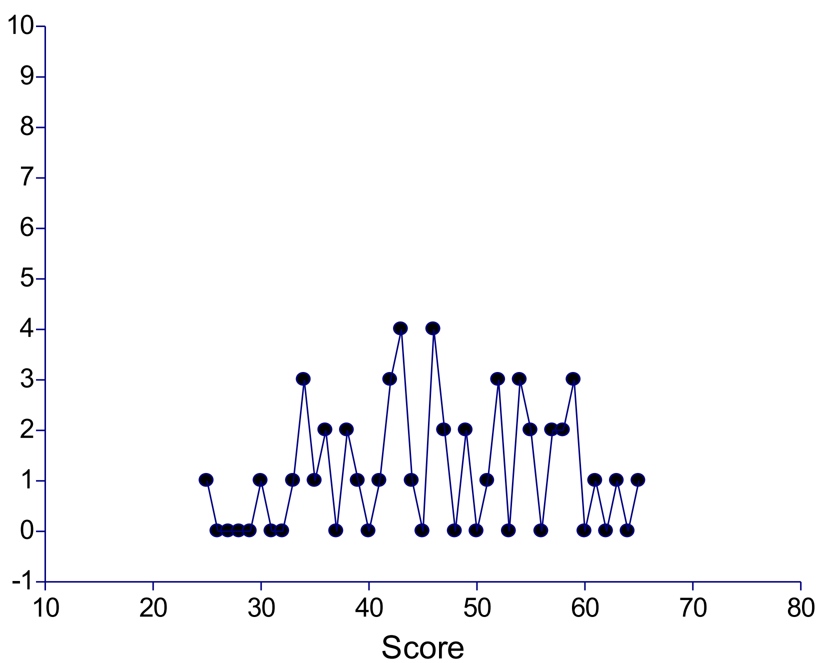

Figure B12b. Distribution for the SMALSI Note Taking/Listening Skills Standard T Scores, Fifth Grade

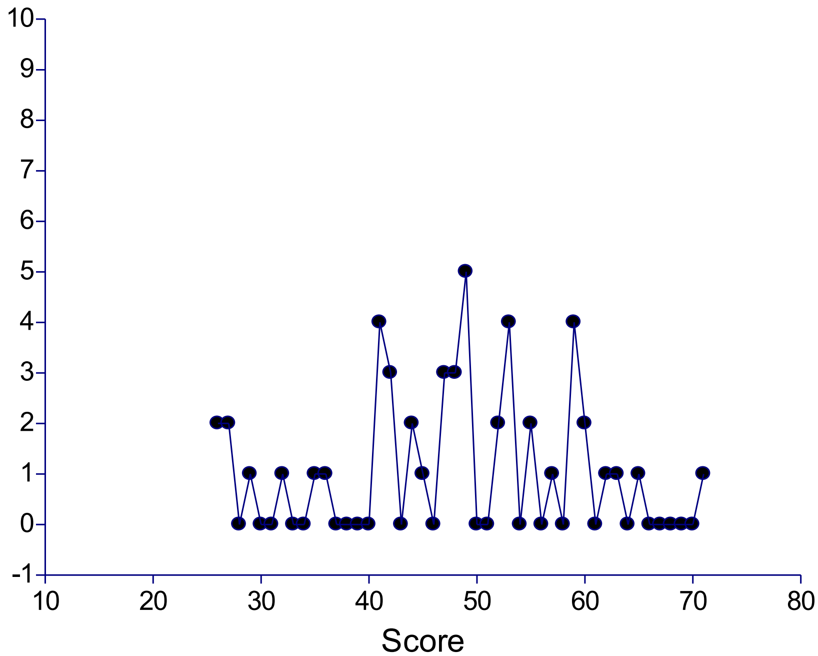

Figure B12c. Distribution for the SMALSI Reading/Comprehension Strategies Standard T Scores, Fifth Grade

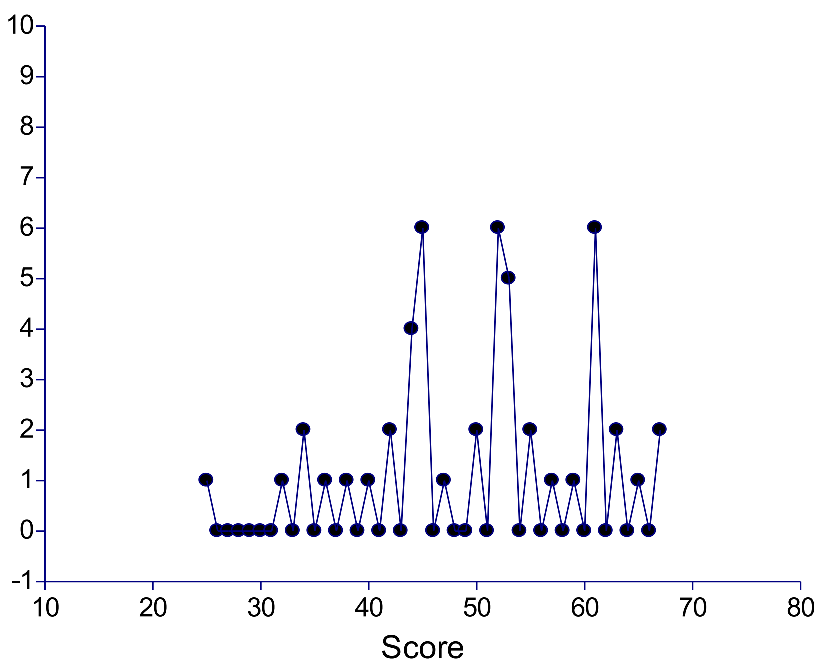

Figure B12d. Distribution for the SMALSI Writing/Research Skills Standard T Scores, Fifth Grade

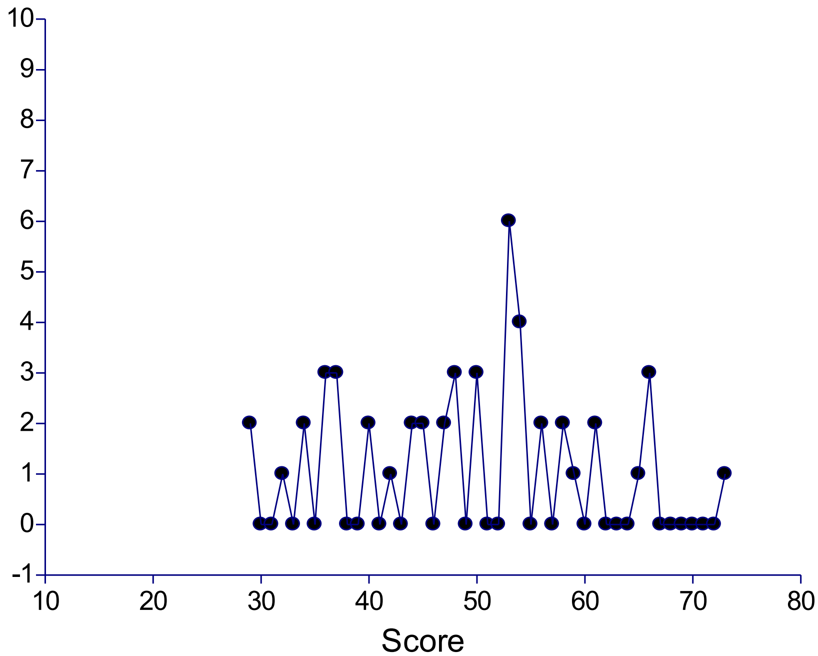

Figure B12e. Distribution for the SMALSI Test-Taking Strategies Standard T Scores, Fifth Grade

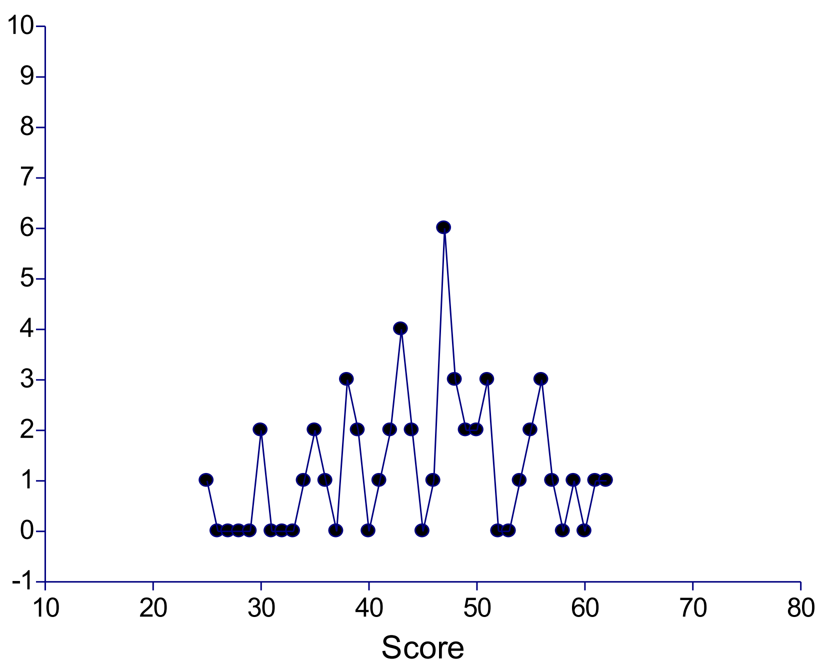

Figure B12f. Distribution for the SMALSI Time Management/ Organizational Techniques Standard T Scores, Fifth Grade

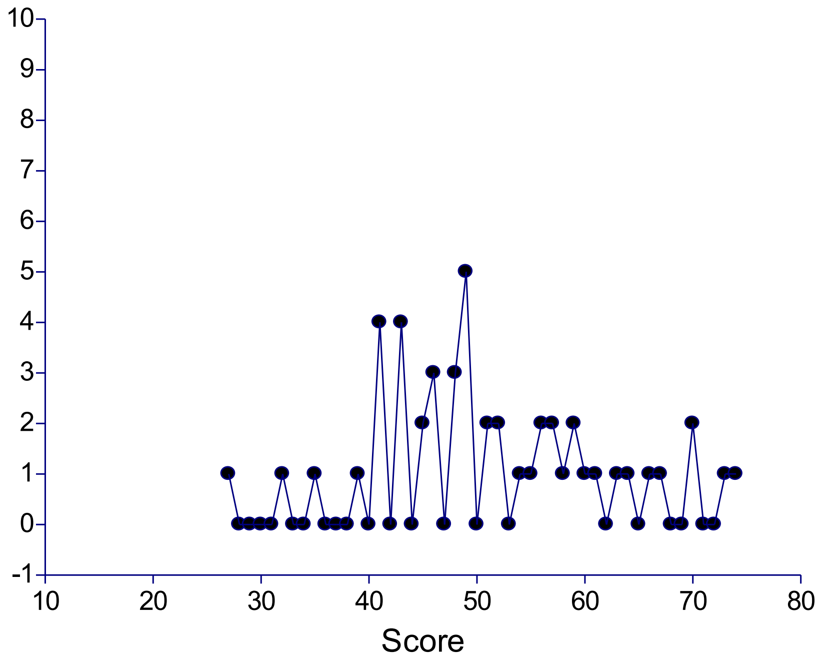

Figure B12g. Distribution for the SMALSI Low Academic Motivation Standard T Scores, Fifth Grade

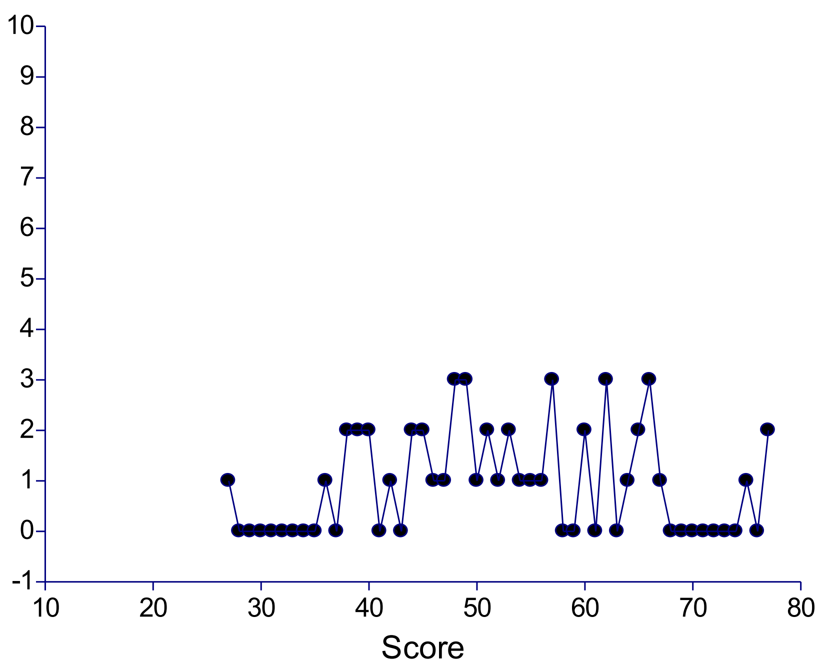

Figure B12h. Distribution for the SMALSI Test Anxiety Standard T Scores, Fifth Grade

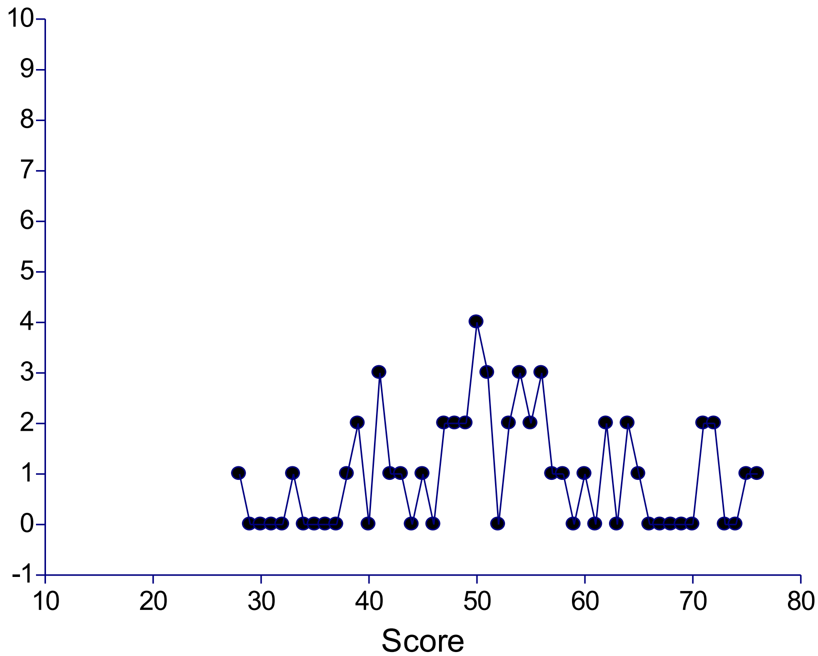

Figure B12i. Distribution for the SMALSI Concentration/Attention Difficulties Standard T Scores, Fifth Grade

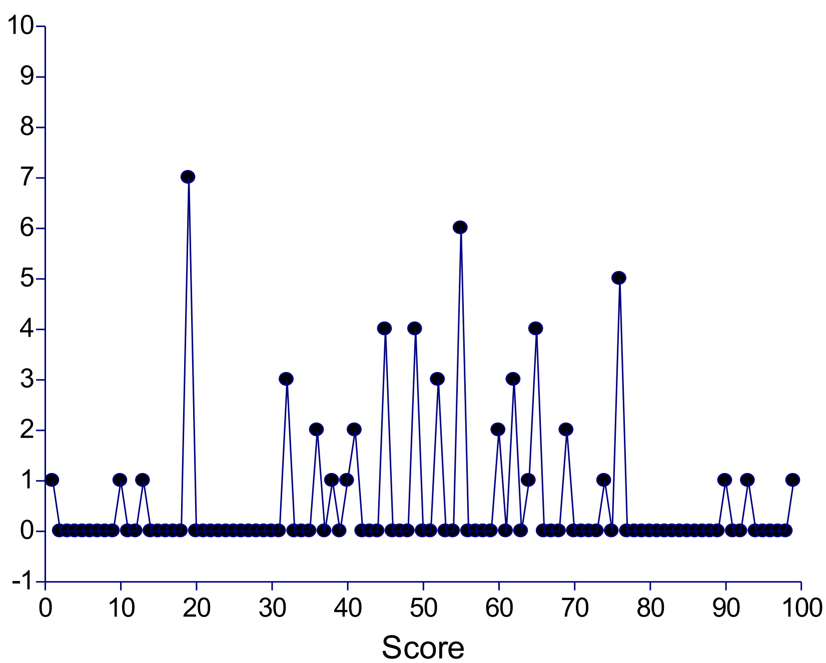

Figure B13a. Distribution for the AIMSWeb Computation Normal Curve Equivalent Scores, Third Grade

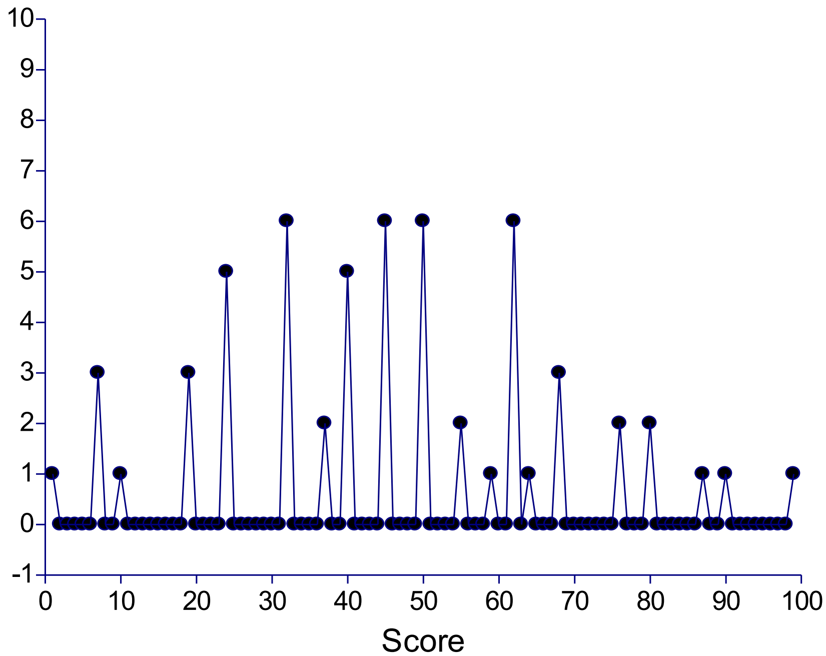

Figure B13b. Distribution for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Third Grade

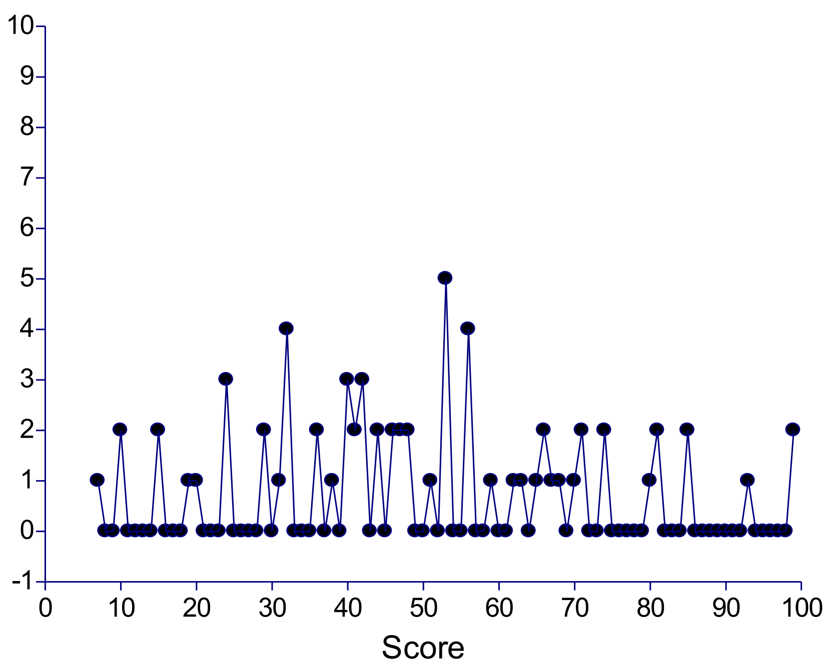

Figure B13c. Distribution for the AIMSWeb Computation Normal Curve Equivalent Scores, Fourth Grade

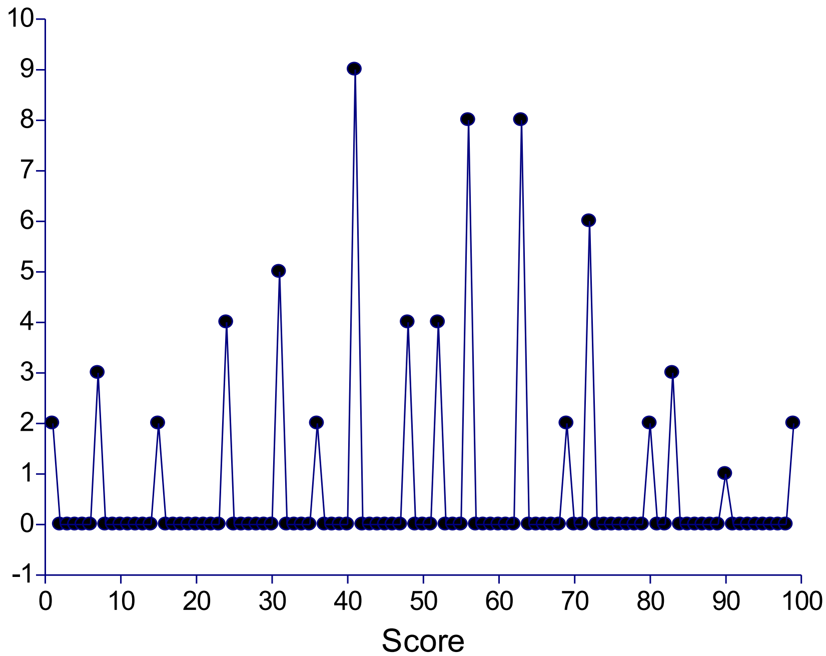

Figure B13d. Distribution for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Fourth Grade

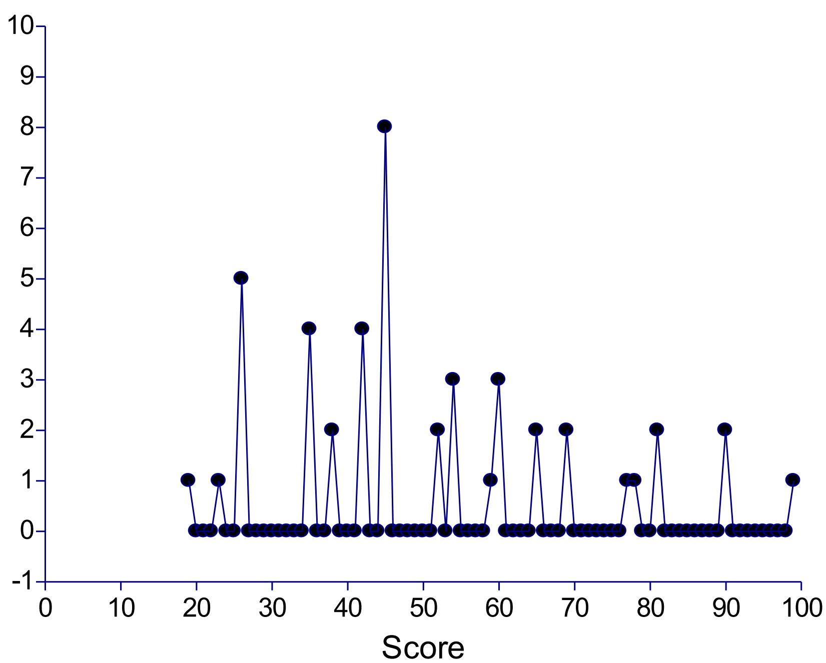

Figure B13e. Distribution for the AIMSWeb Computation Normal Curve Equivalent Scores, Fifth Grade

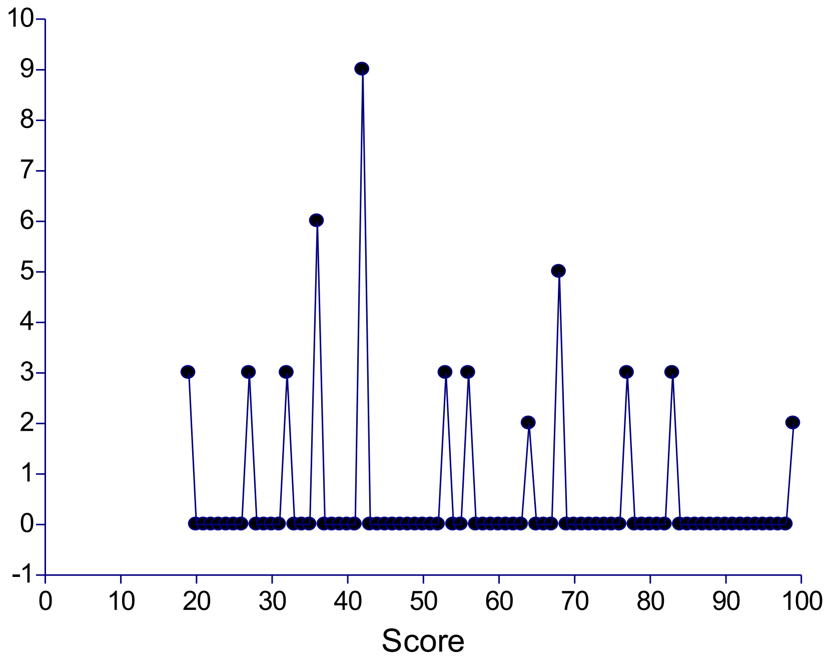

Figure B13f. Distribution for the AIMSWeb Concepts and Applications Normal Curve Equivalent Scores, Fifth Grade

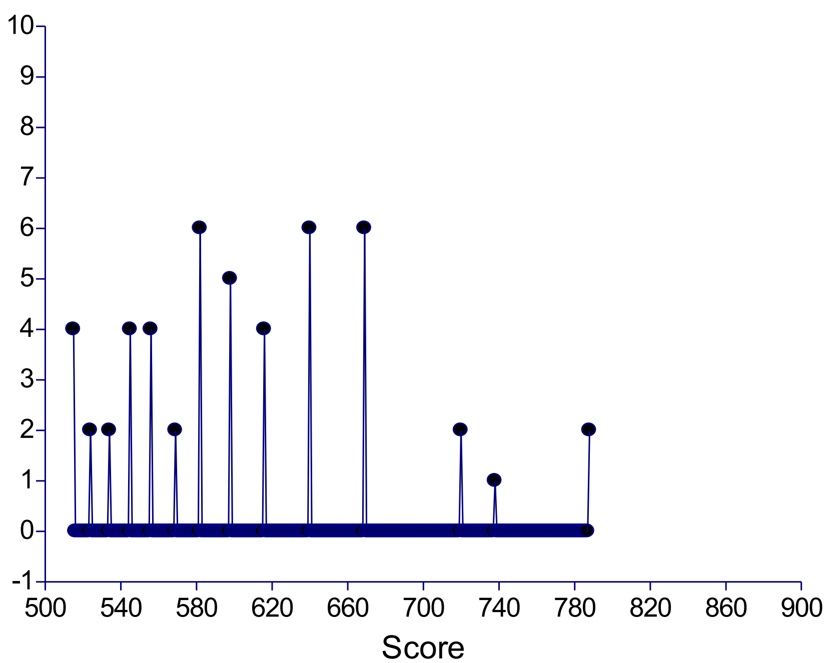

Figure B14a. Distribution for the TAKS Math Standard Scores, Third Grade

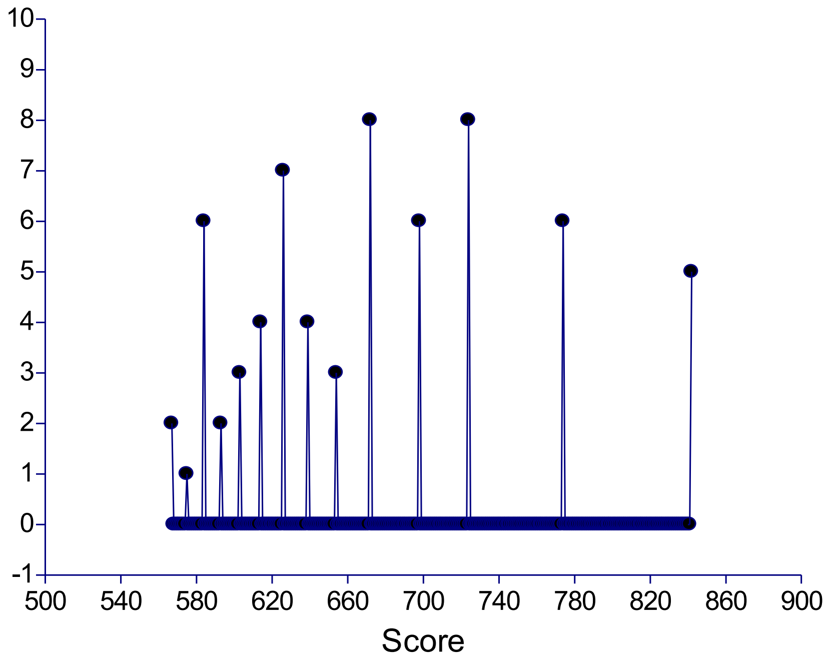

Figure B14b. Distribution for the TAKS Math Standard Scores, Fourth Grade

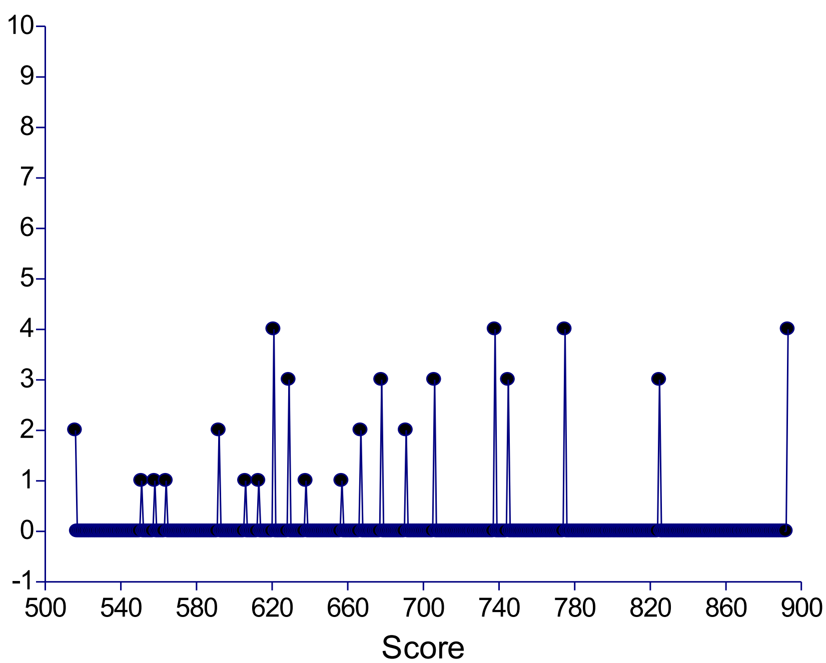

Figure B14c. Distribution for the TAKS Math Standard Scores, Fifth Grade

APPENDIX C

SCATTERPLOTS FOR CORRELATIONS USED IN THIS STUDY

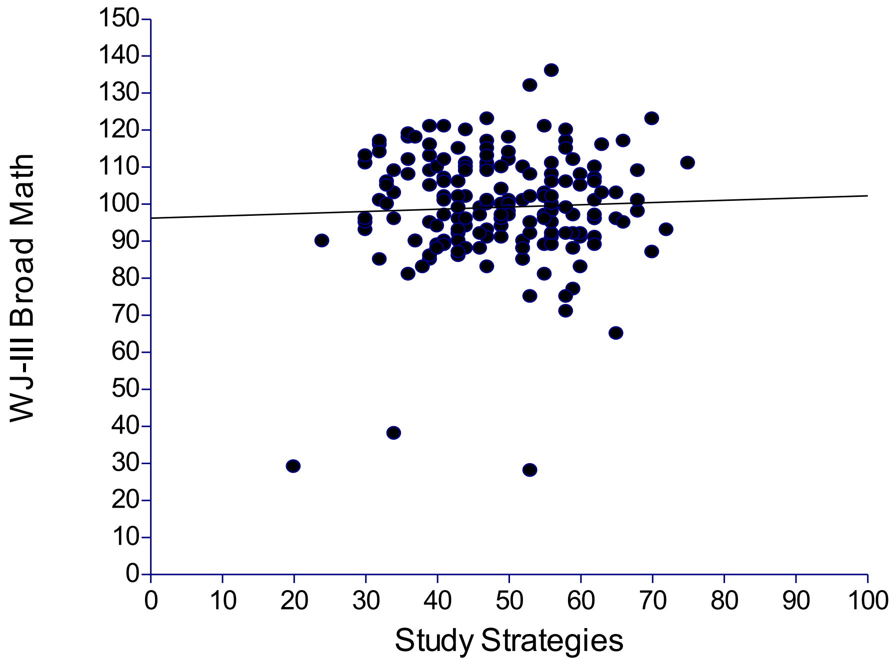

Figure C1a. Scatterplot for SMALSI Study Strategies and WJ-III Broad Math, Full Sample

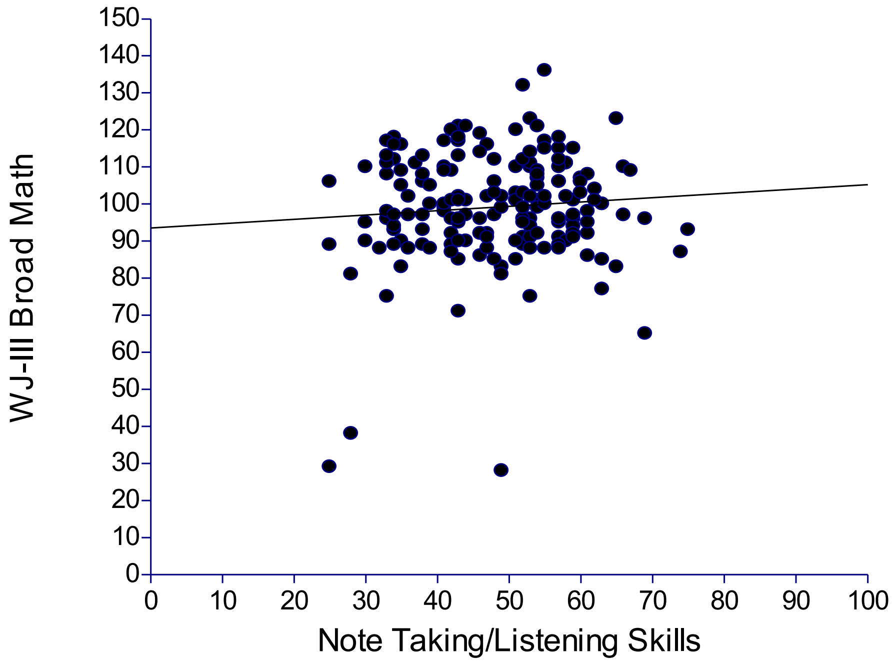

Figure C1b. Scatterplot of SMALSI Note Taking/Listening Skills and WJ-III Broad Math, Full Sample

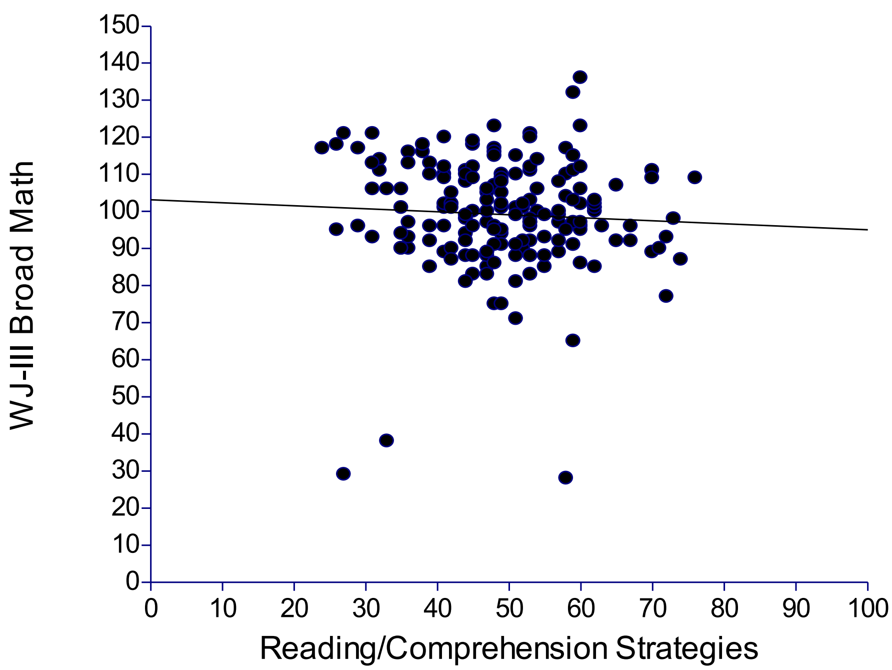

Figure C1c. Scatterplot of SMALSI Reading/Comprehension Strategies and WJ-III Broad Math, Full Sample

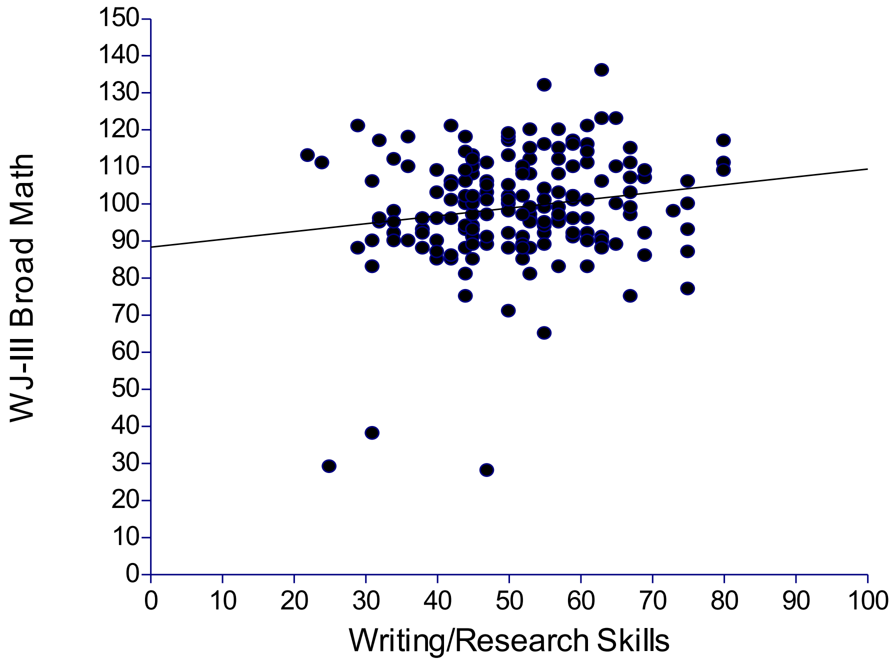

Figure C1d. Scatterplot of SMALSI Writing/Research Skills and WJ-III Broad Math, Full Sample

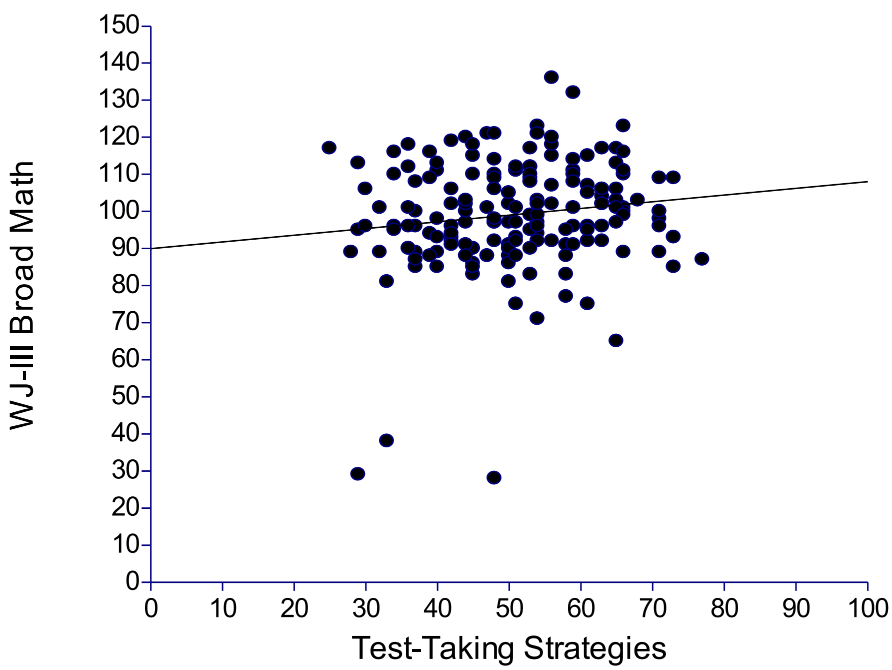

Figure C1e. Scatterplot of SMALSI Test-Taking Strategies and WJ-III Broad Math, Full Sample

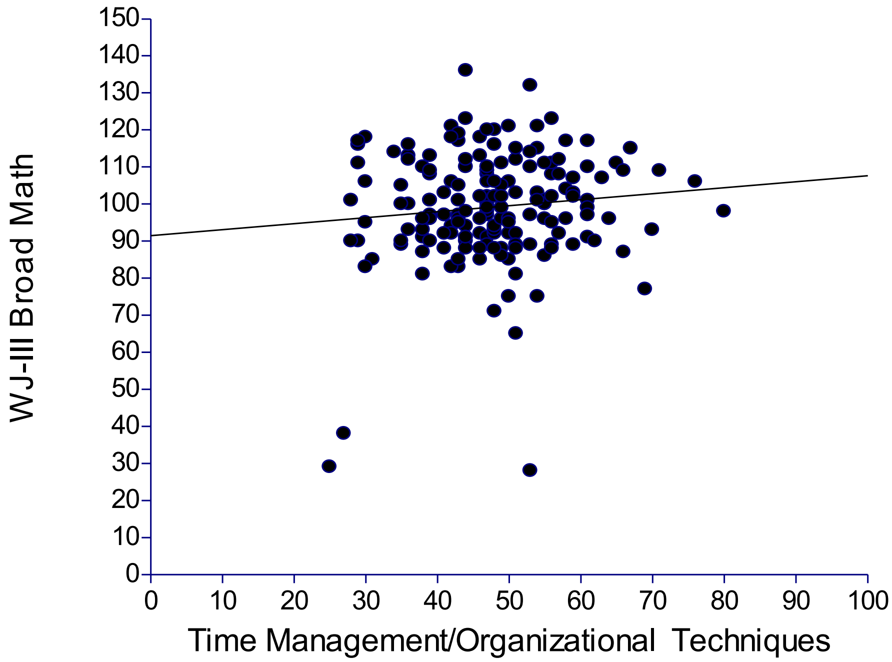

Figure C1f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Broad Math, Full Sample

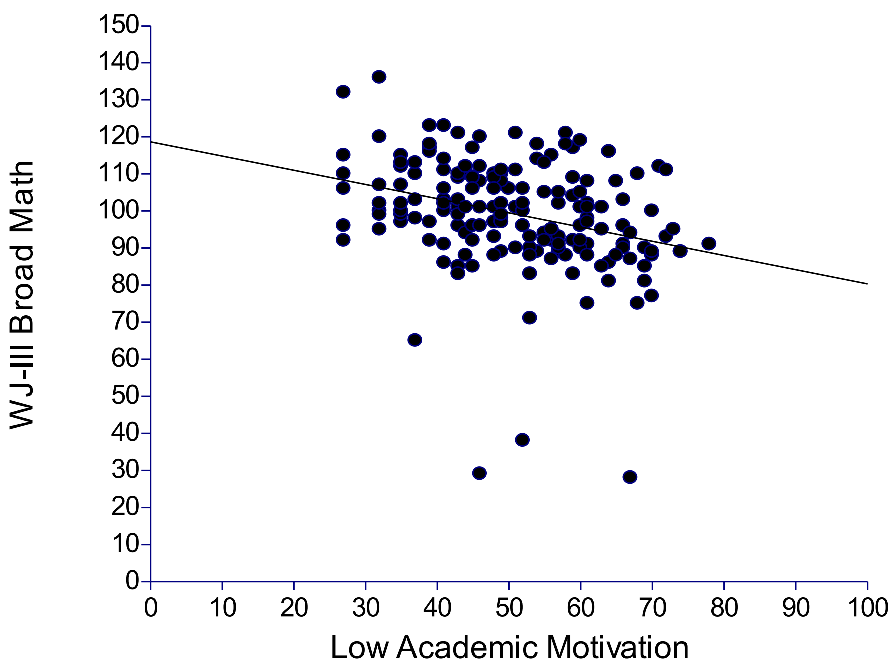

Figure C1g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Broad Math, Full Sample

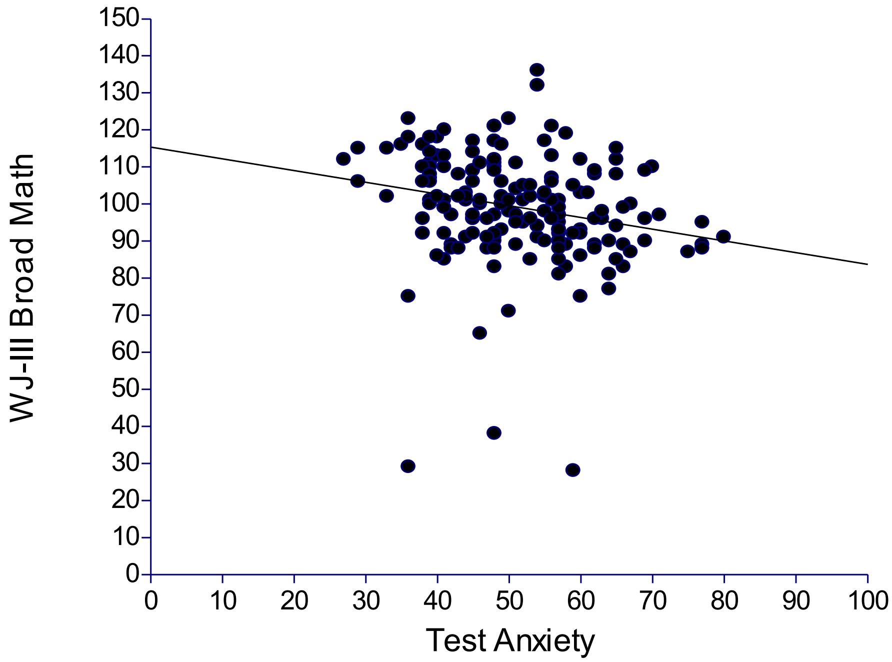

Figure C1h. Scatterplot for SMALSI Test Anxiety and WJ-III Broad Math, Full Sample

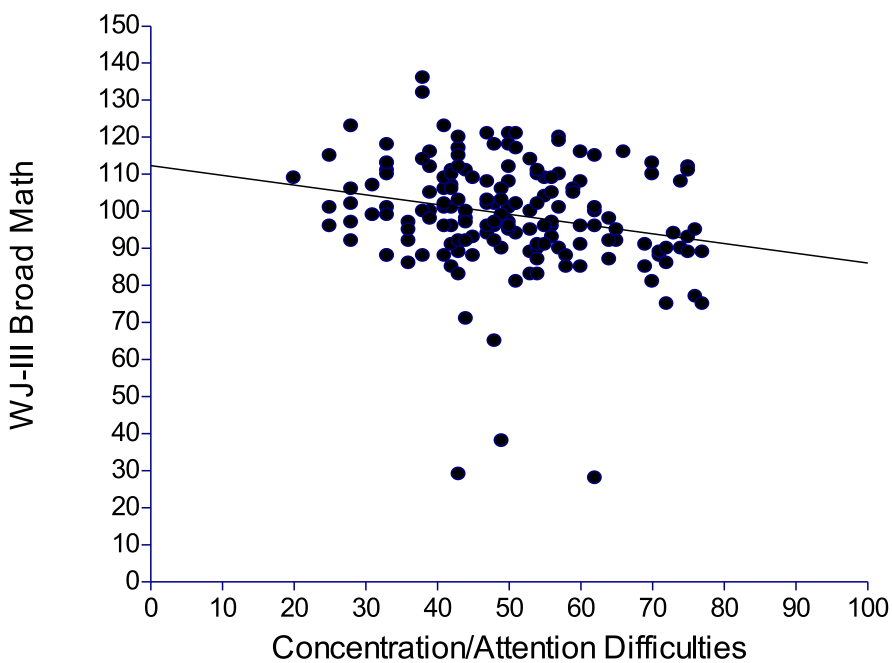

Figure C1i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Broad Math, Full Sample

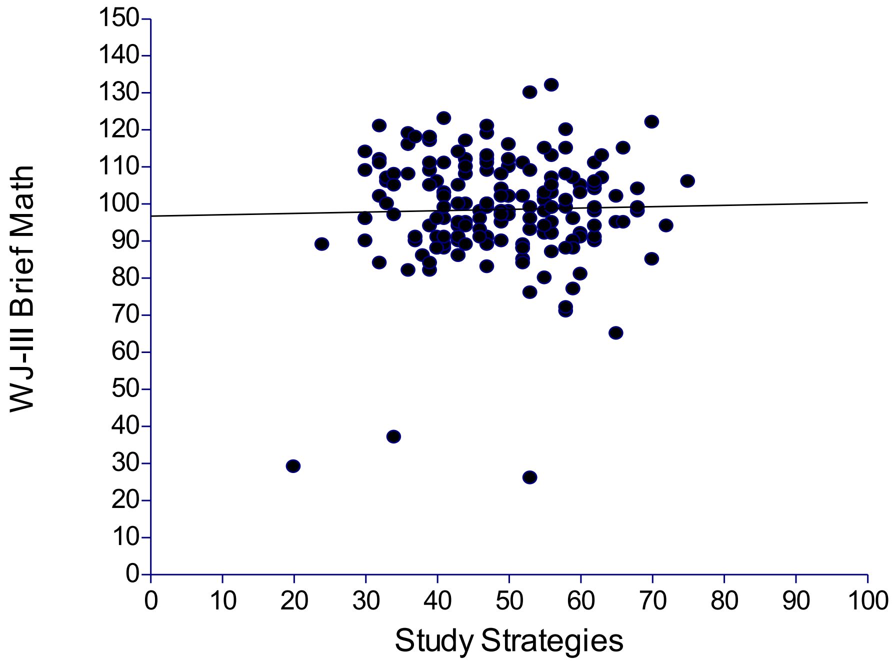

Figure C2a. Scatterplot for SMALSI Study Strategies and WJ-III Brief Math, Full Sample

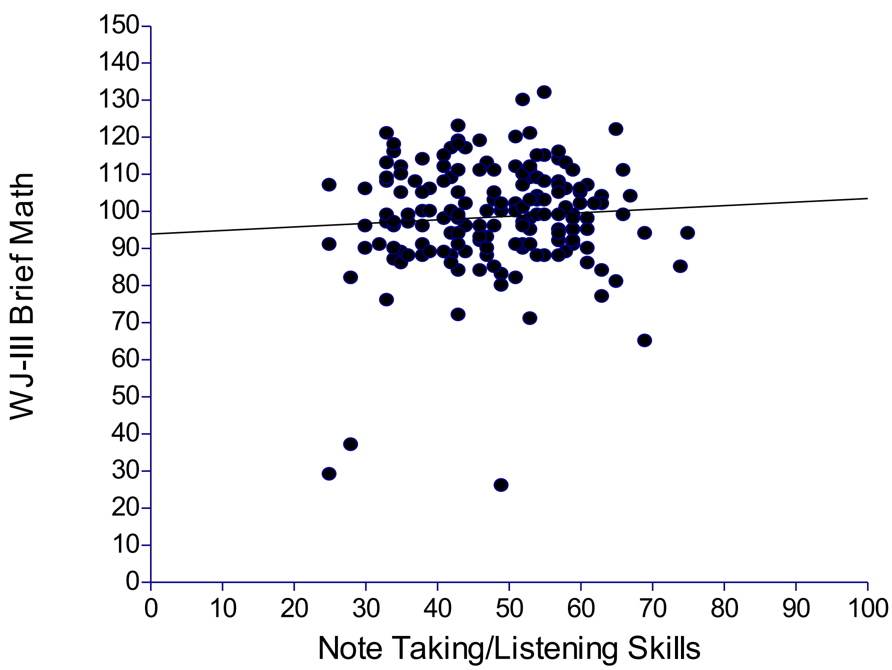

Figure C2b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Brief Math, Full Sample

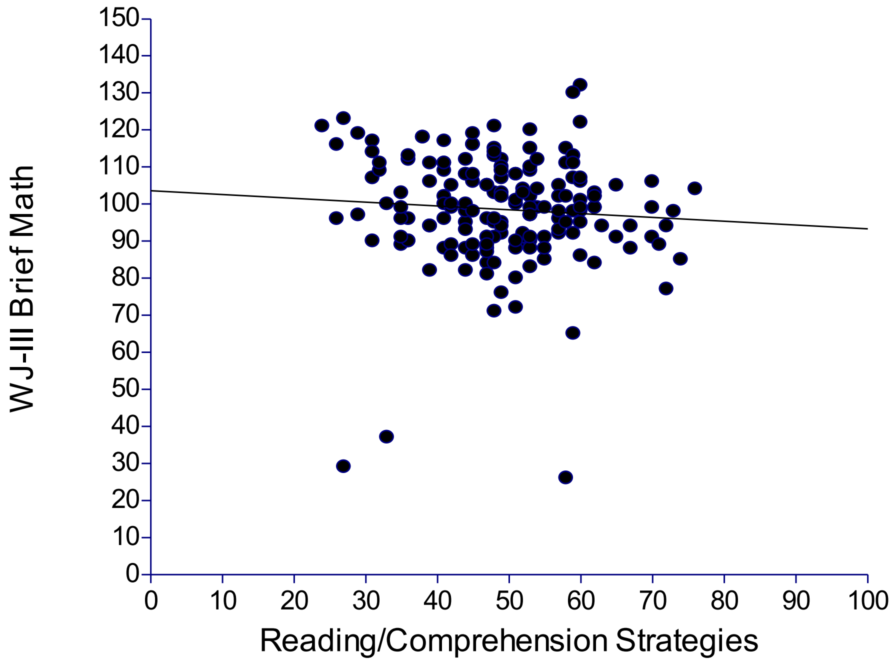

Figure C2c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Brief Math, Full Sample

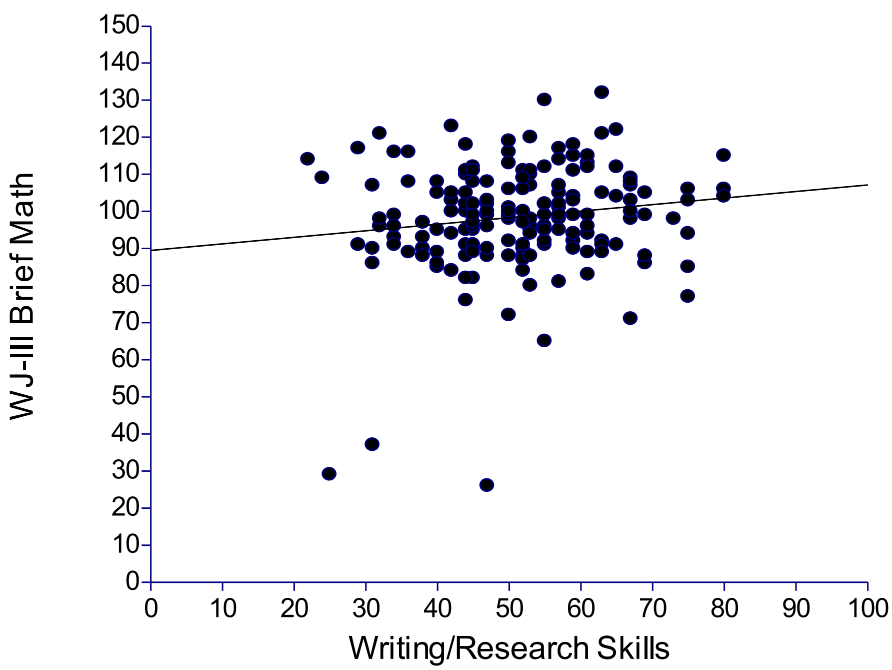

Figure C2d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Brief Math, Full Sample

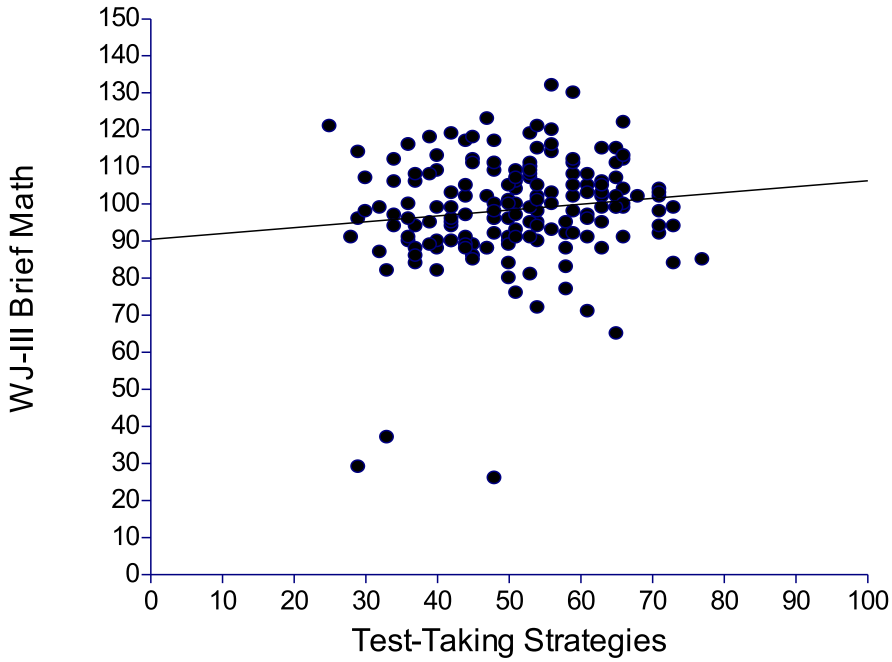

Figure C2e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Brief Math, Full Sample

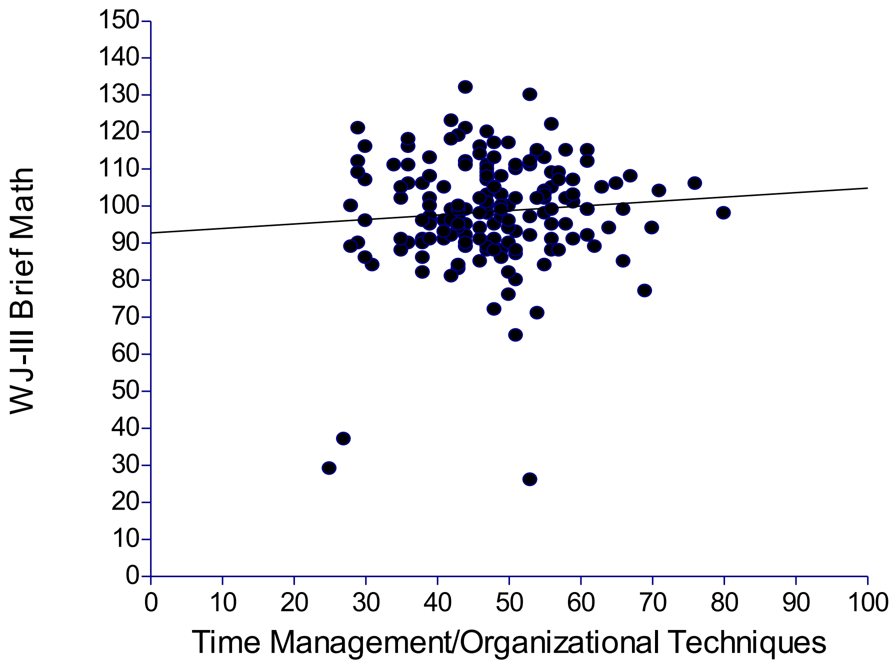

Figure C2f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Brief Math, Full Sample

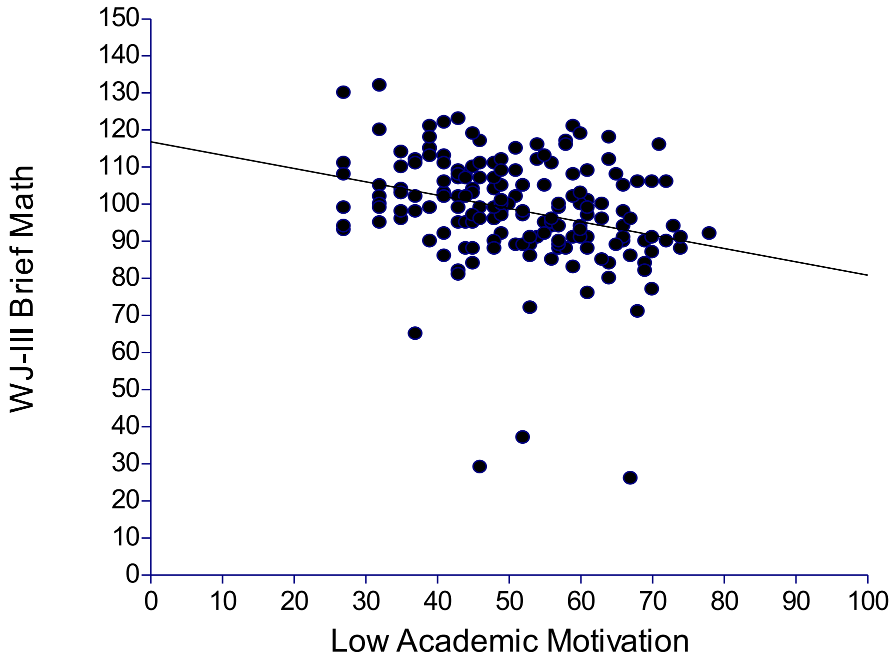

Figure C2g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Brief Math, Full Sample

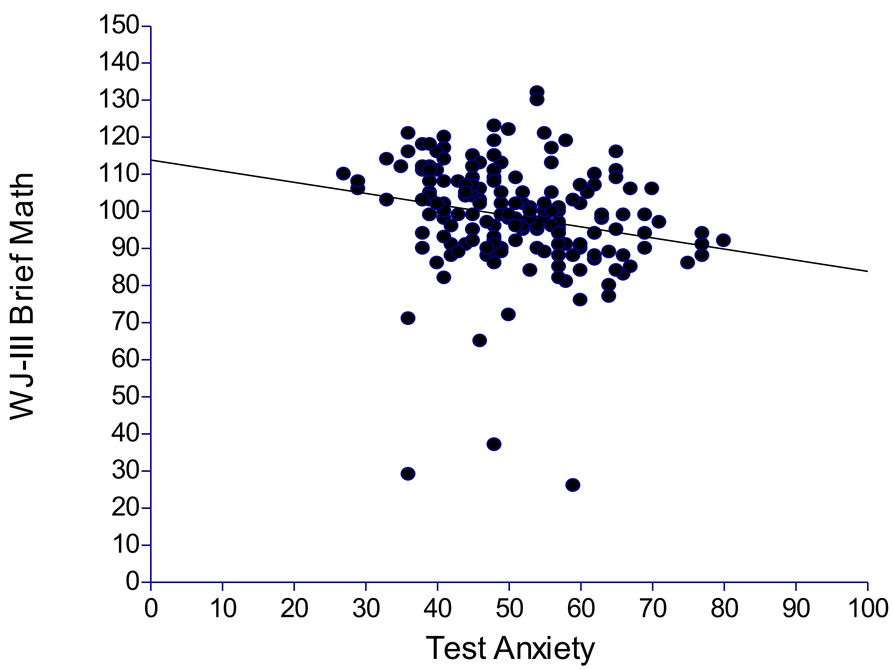

Figure C2h. Scatterplot for SMALSI Test Anxiety and WJ-III Brief Math, Full Sample

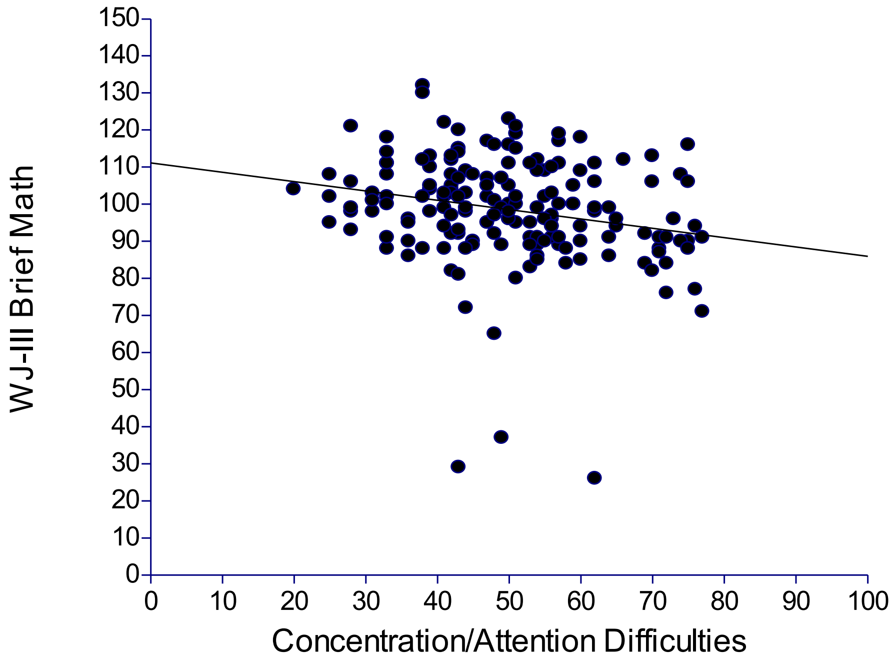

Figure C2i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Brief Math, Full Sample

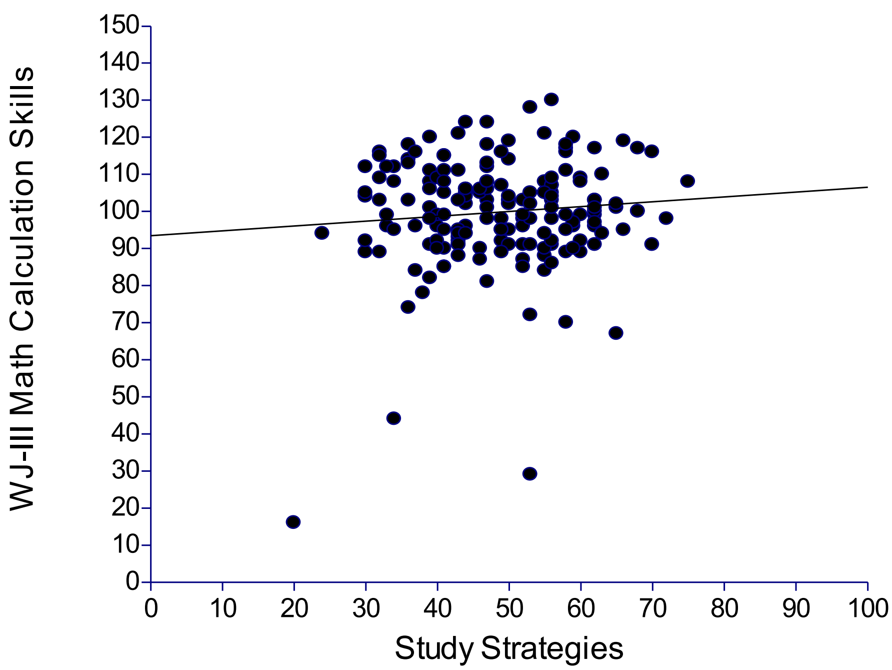

Figure C3a. Scatterplot for SMALSI Study Strategies and WJ-III Math Calculation Skills, Full Sample

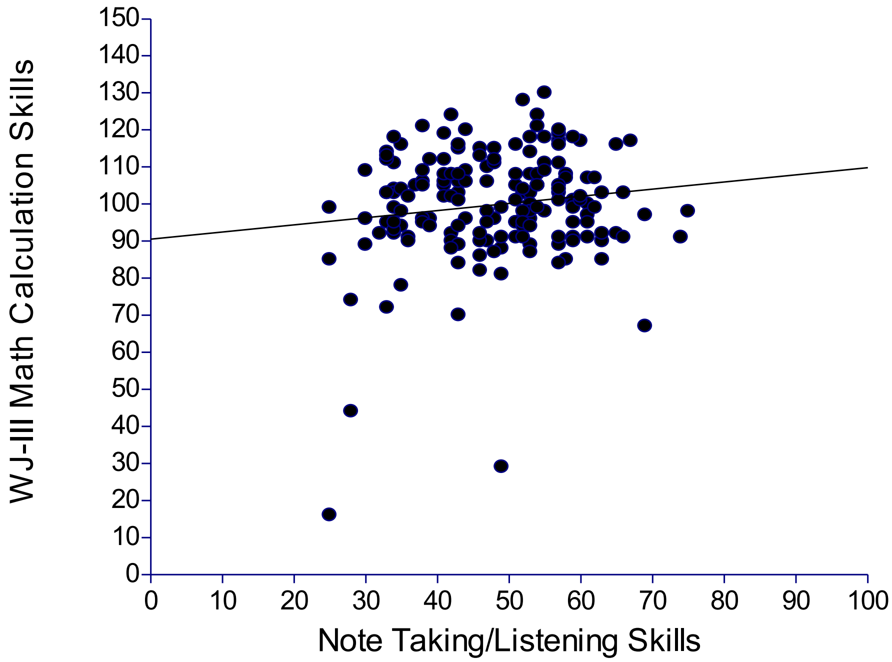

Figure C3b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Calculation Skills, Full Sample

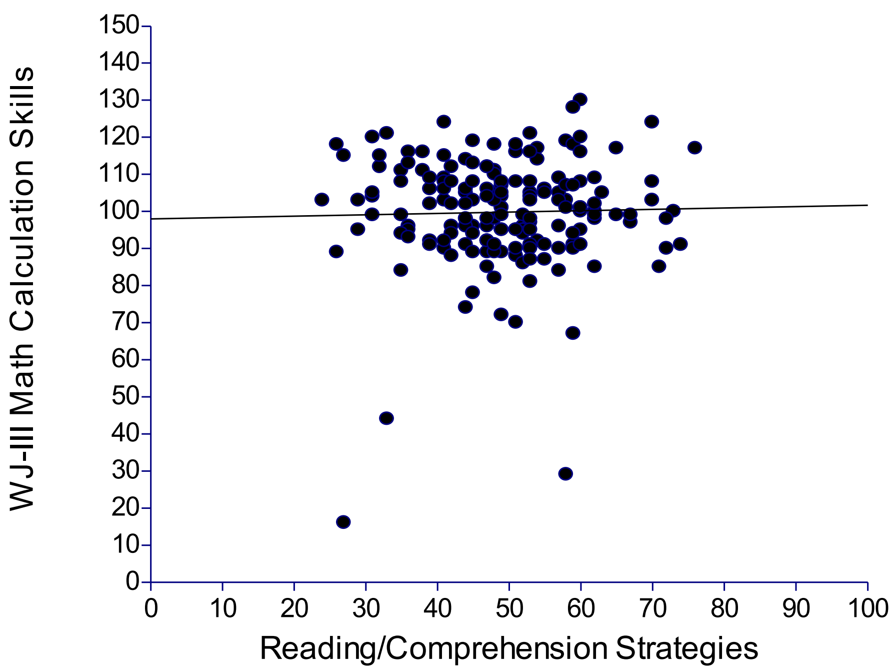

Figure C3c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Calculation Skills, Full Sample

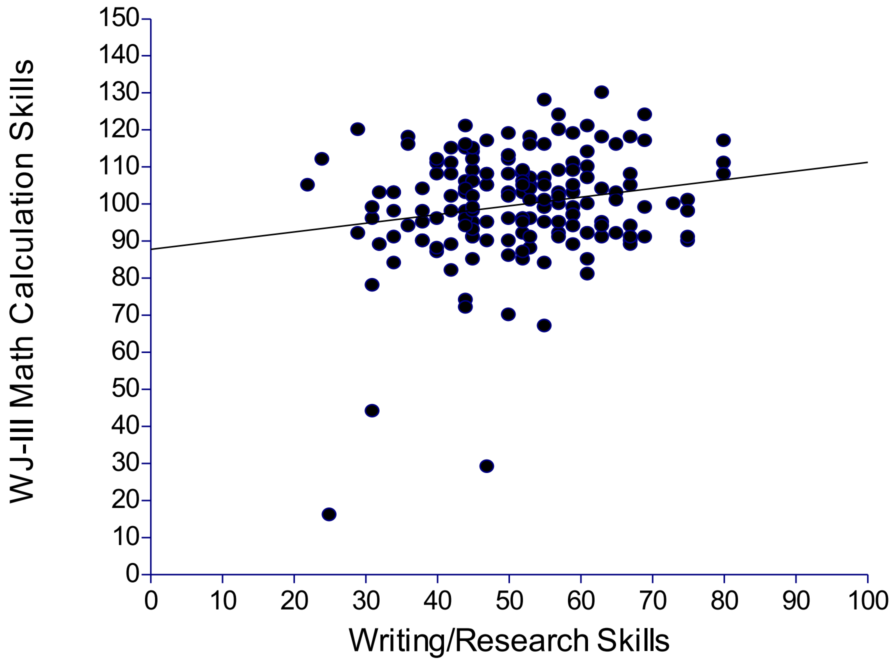

Figure C3d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Calculation Skills, Full Sample

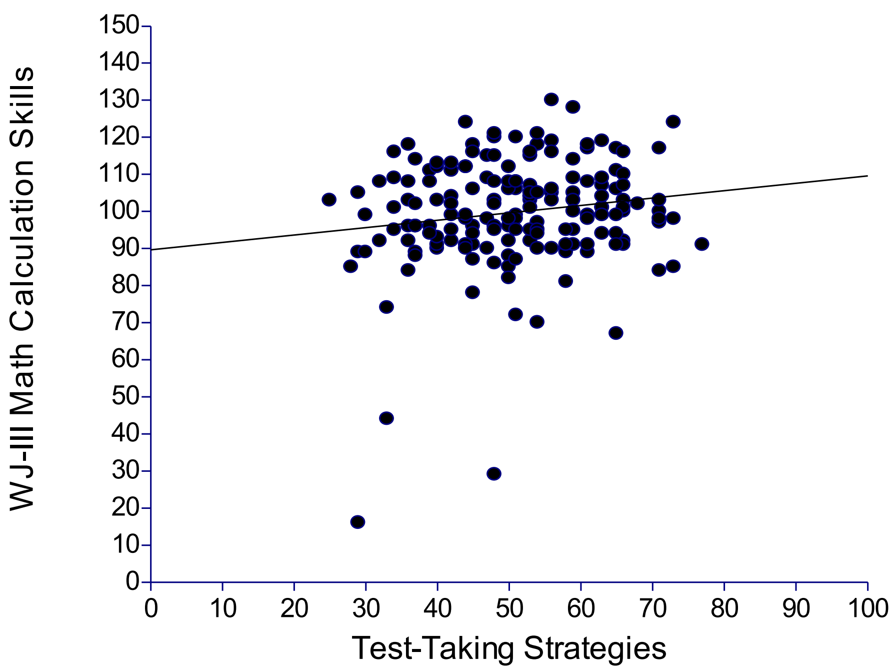

Figure C3e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Calculation Skills, Full Sample

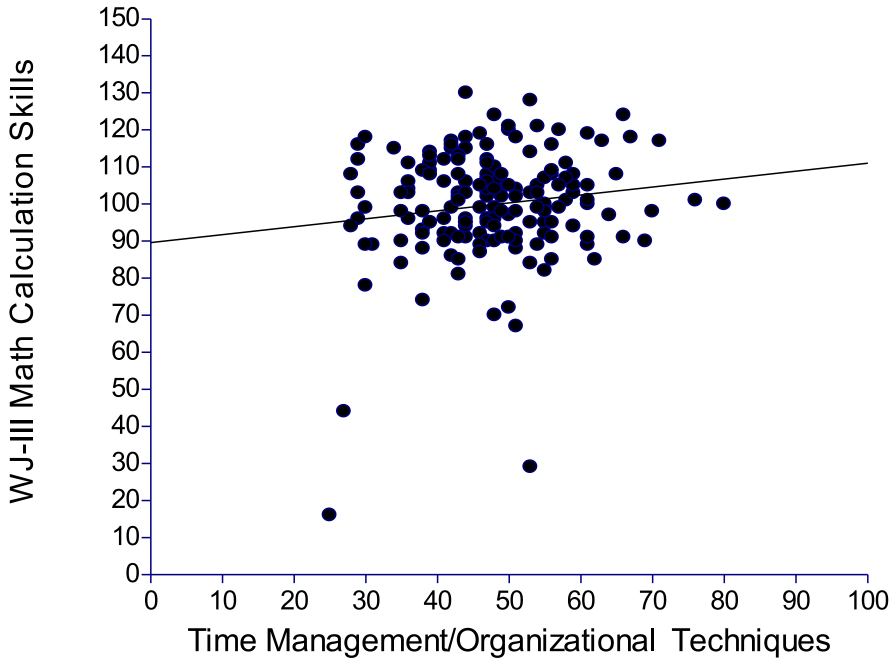

Figure C3f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Calculation Skills, Full Sample

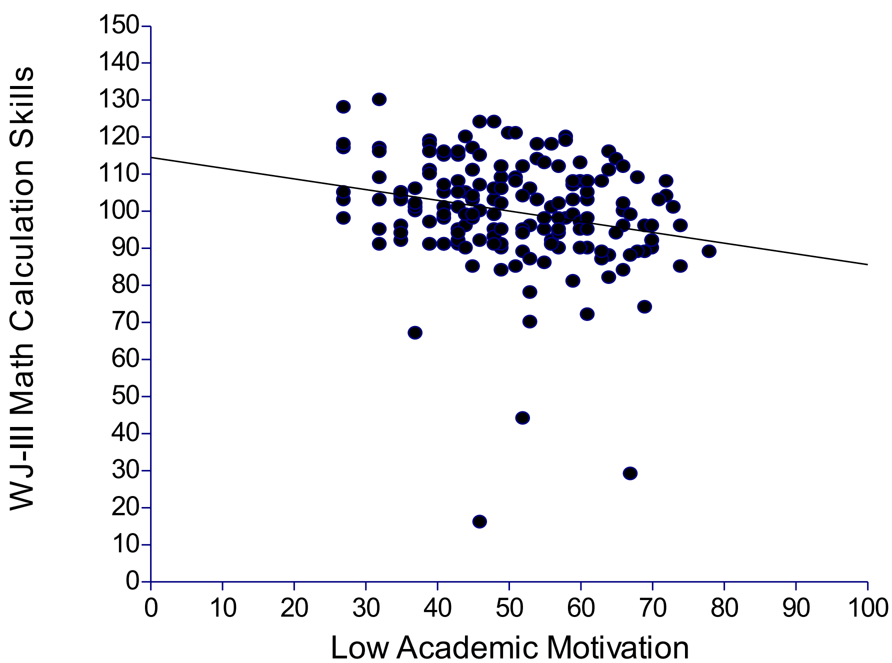

Figure C3g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Calculation Skills, Full Sample

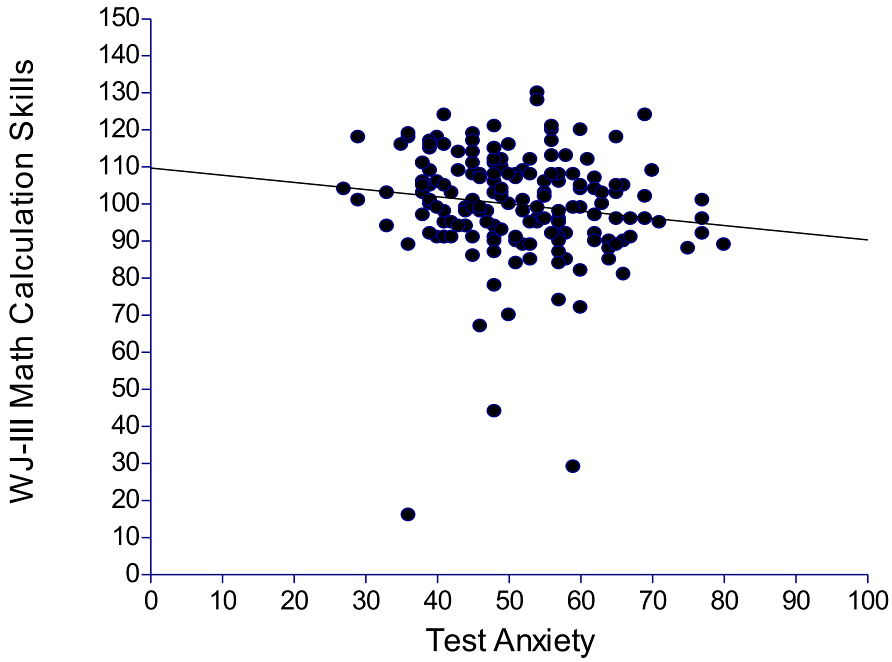

Figure C3h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Calculation Skills, Full Sample

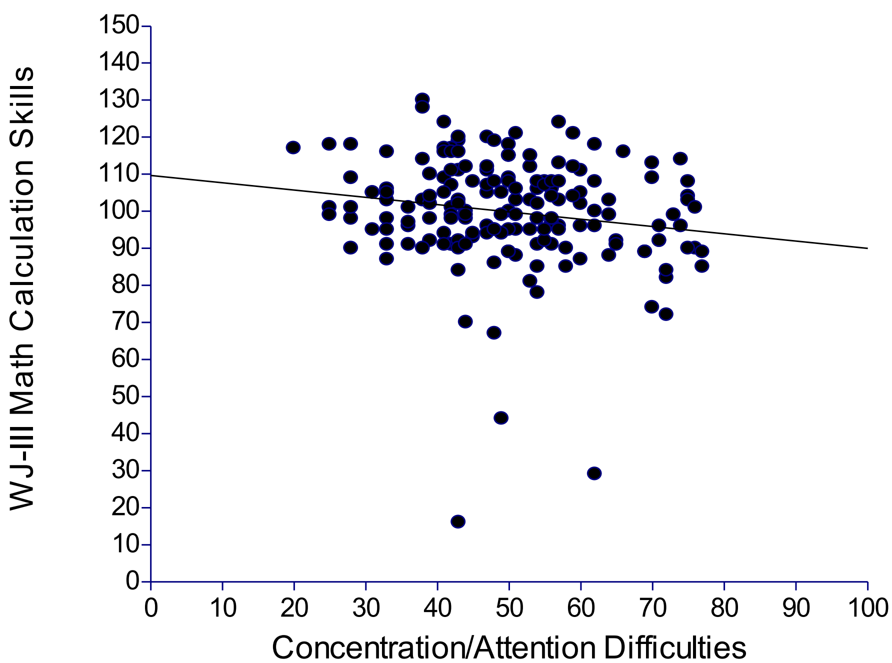

Figure C3i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Calculation Skills, Full Sample

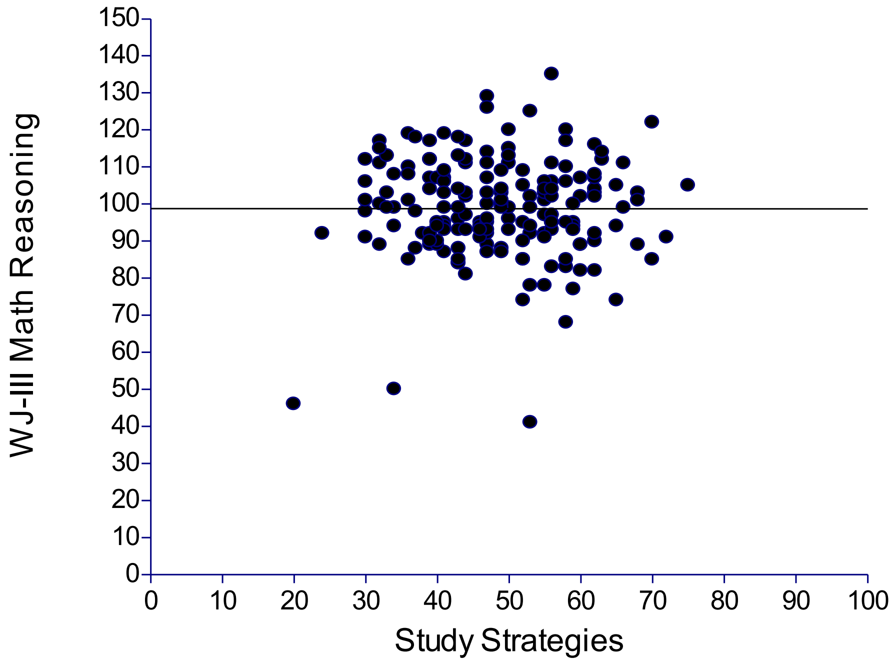

Figure C4a. Scatterplot for SMALSI Study Strategies and WJ-III Math Reasoning, Full Sample

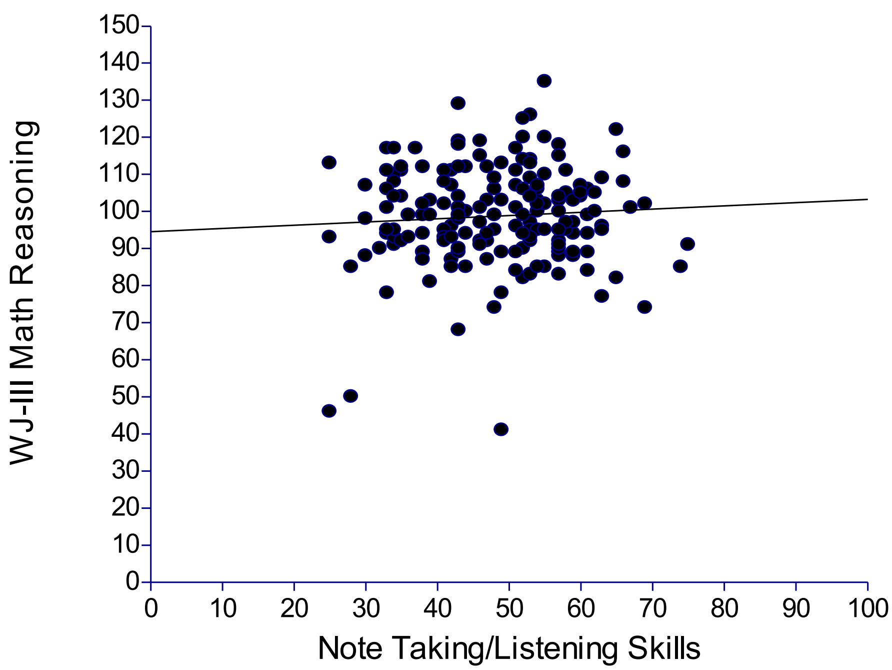

Figure C4b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Reasoning, Full Sample

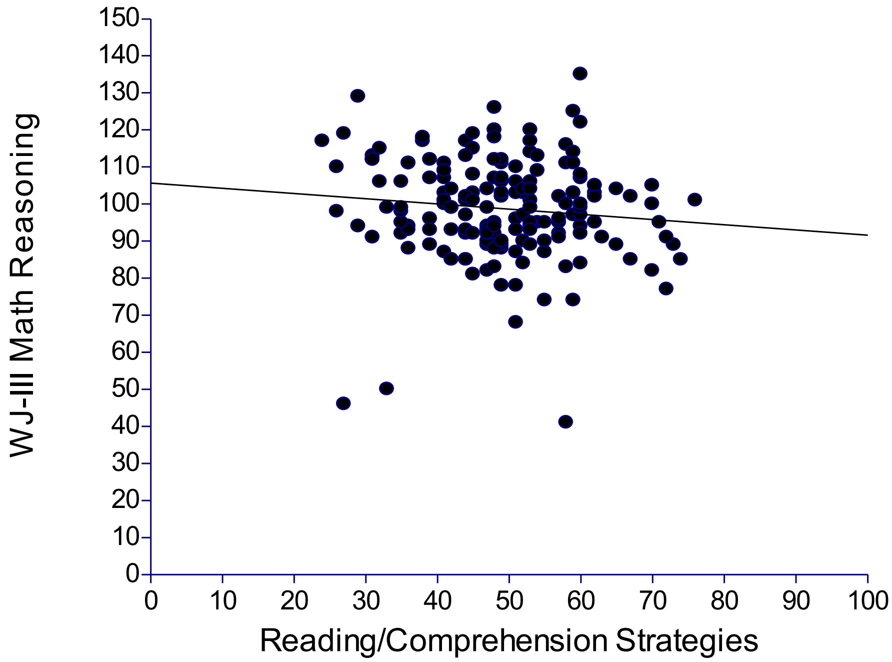

Figure C4c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Reasoning, Full Sample

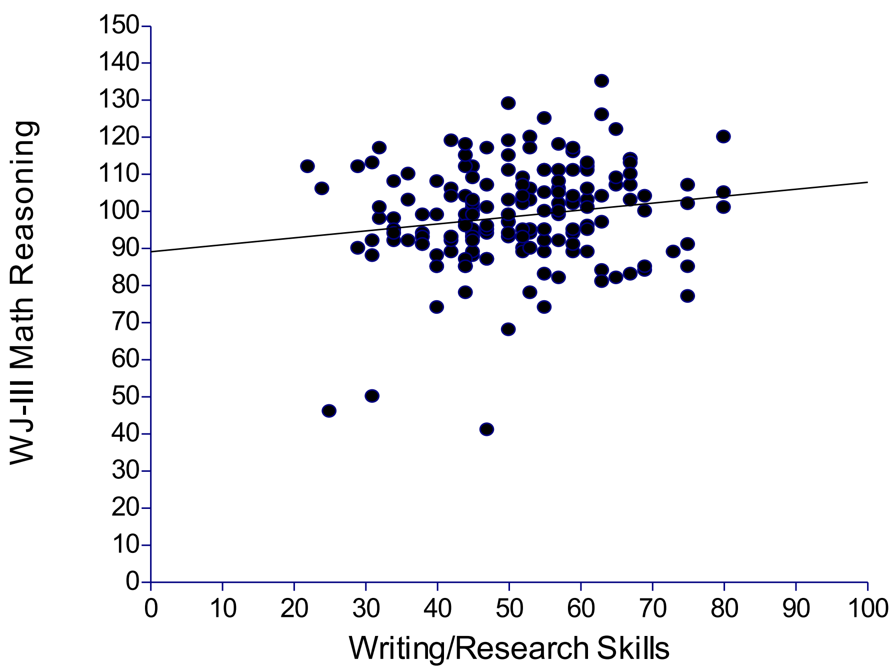

Figure C4d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Reasoning, Full Sample

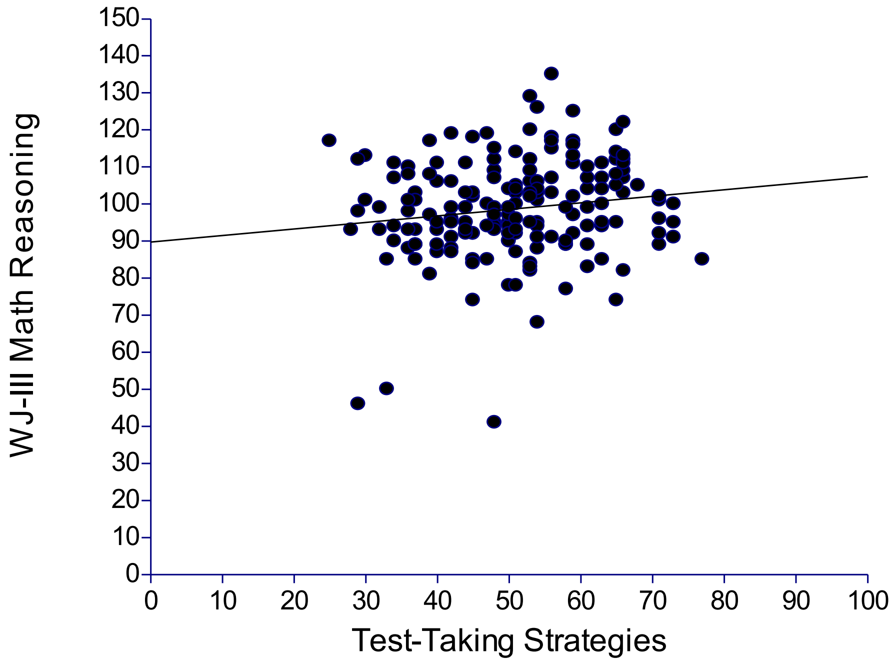

Figure C4e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Reasoning, Full Sample

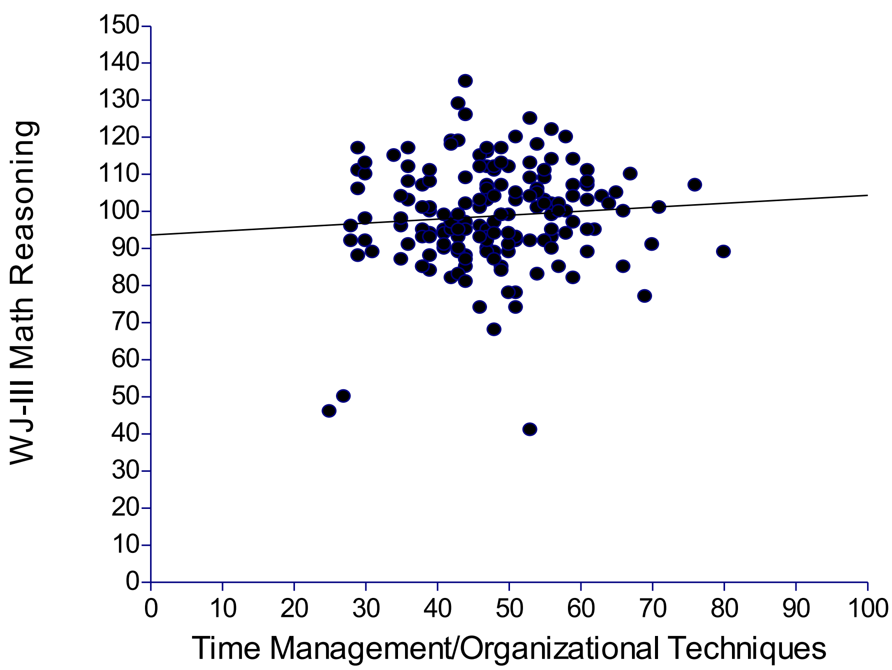

Figure C4f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Reasoning, Full Sample

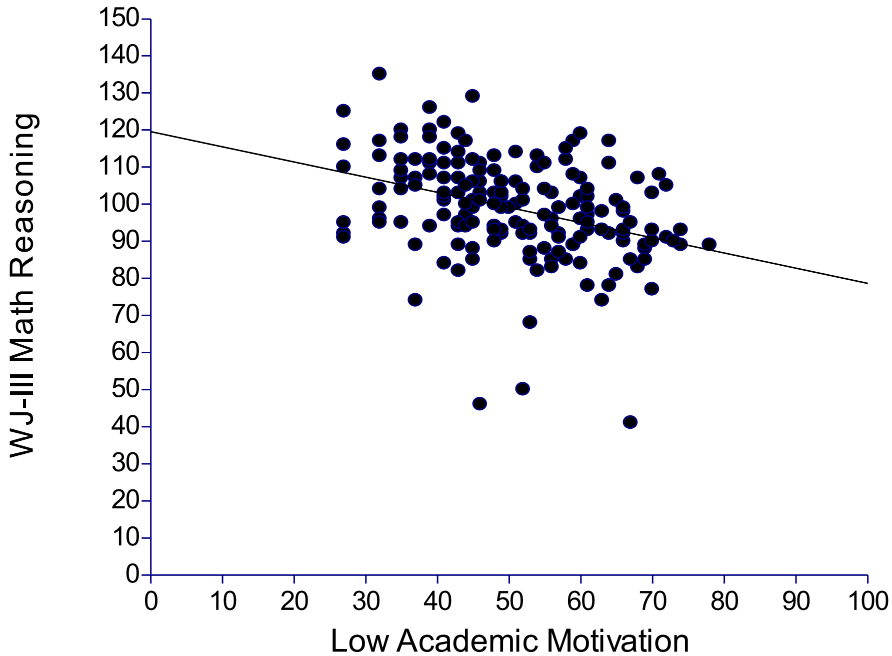

Figure C4g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Reasoning, Full Sample

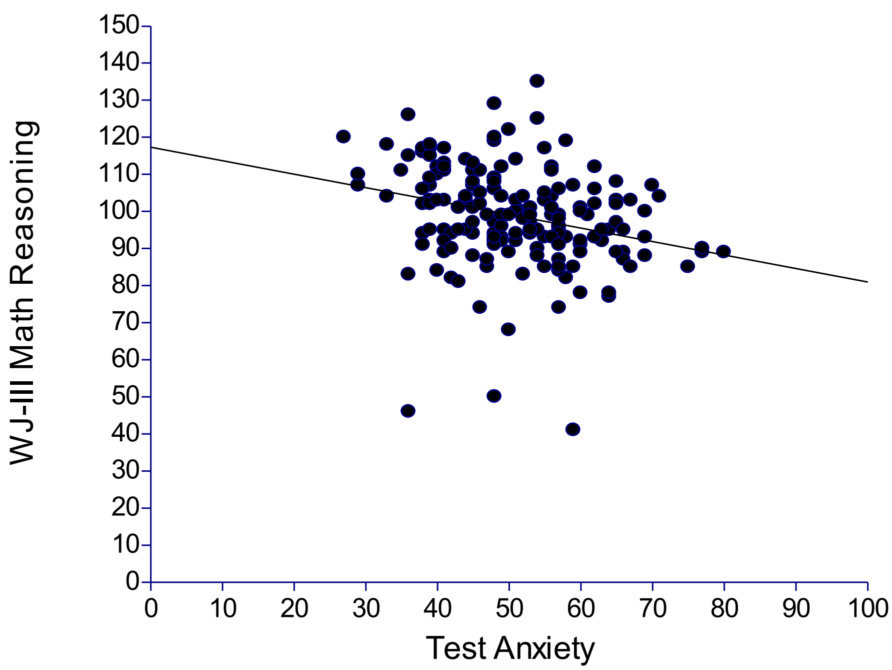

Figure C4h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Reasoning, Full Sample

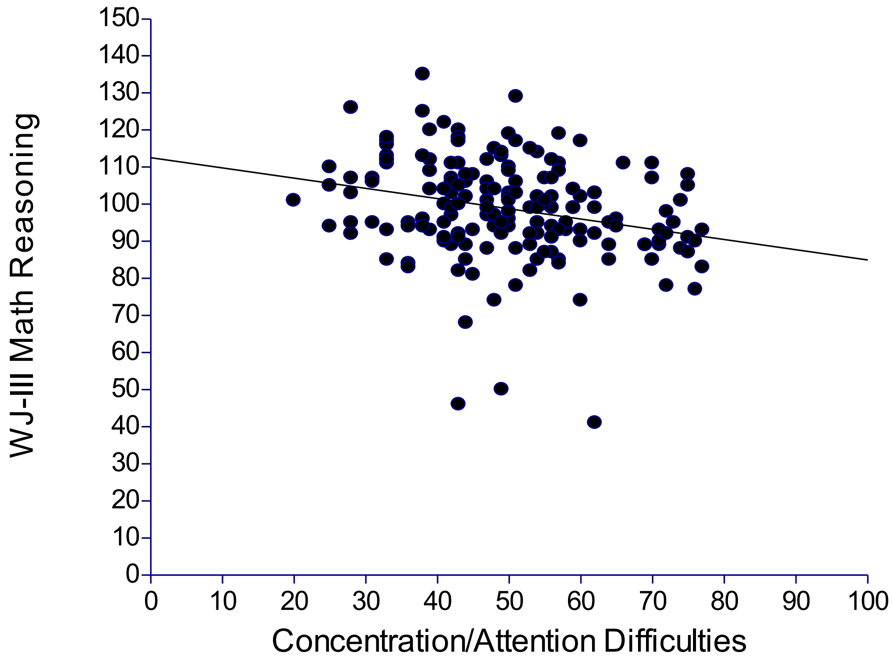

Figure C4i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Reasoning, Full Sample

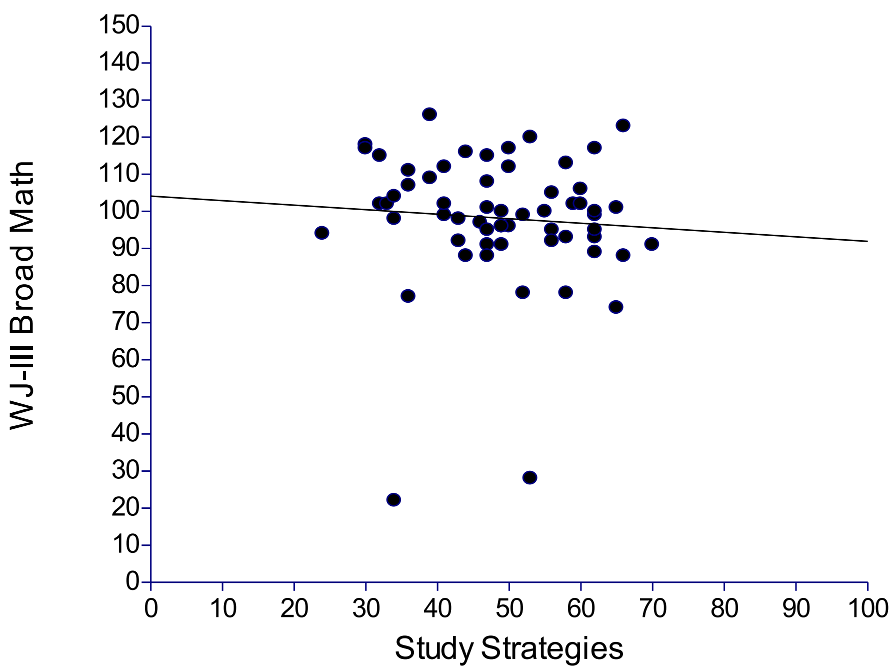

Figure C5a. Scatterplot for SMALSI Study Strategies and WJ-III Broad Math, Third Grade

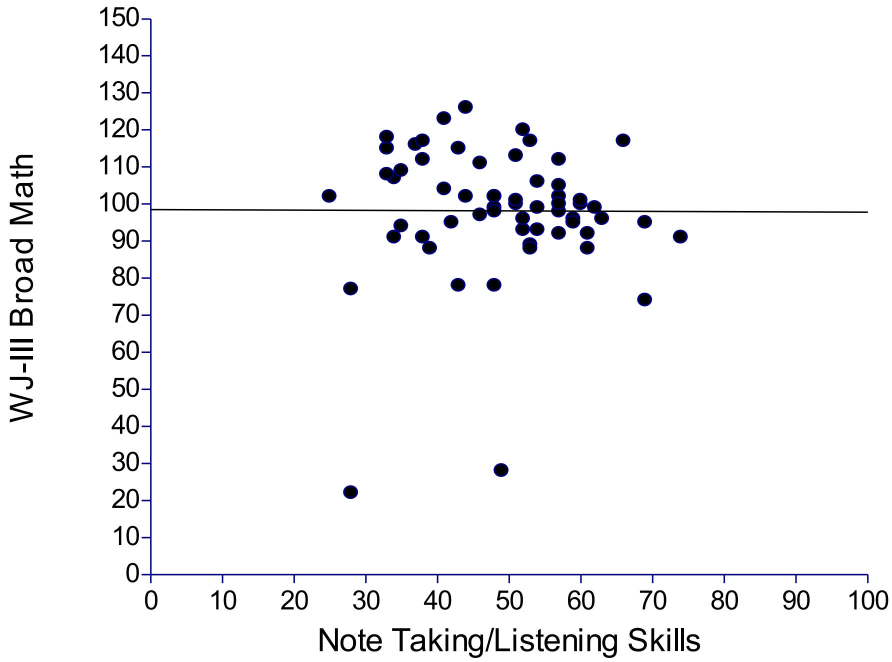

Figure C5b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Broad Math, Third Grade

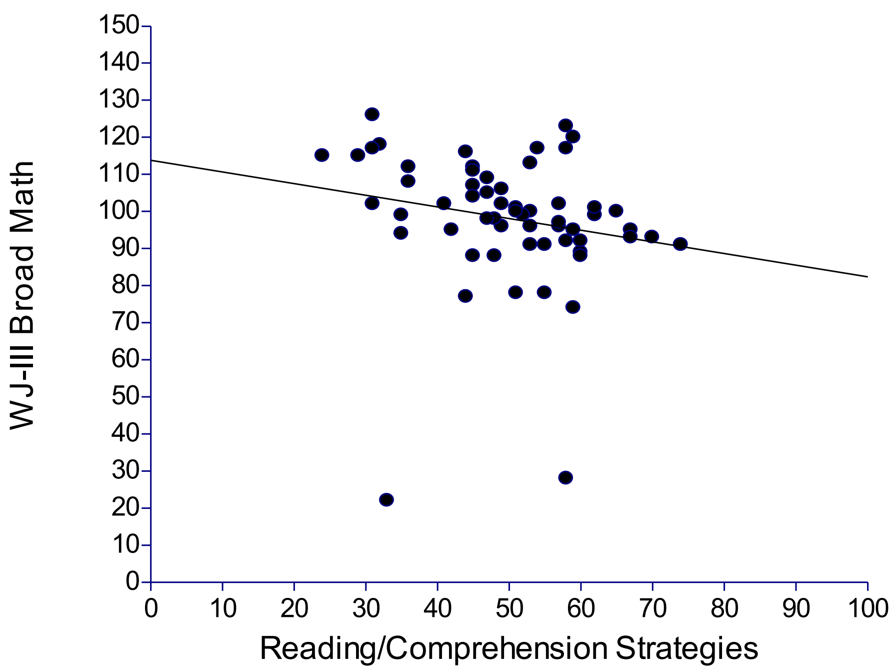

Figure C5c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Broad Math, Third Grade

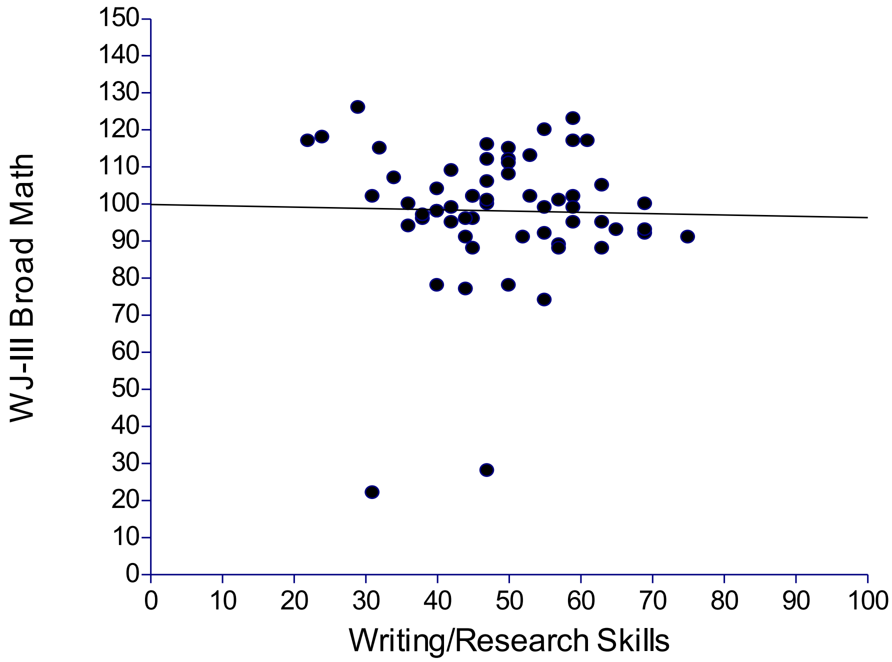

Figure C5d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Broad Math, Third Grade

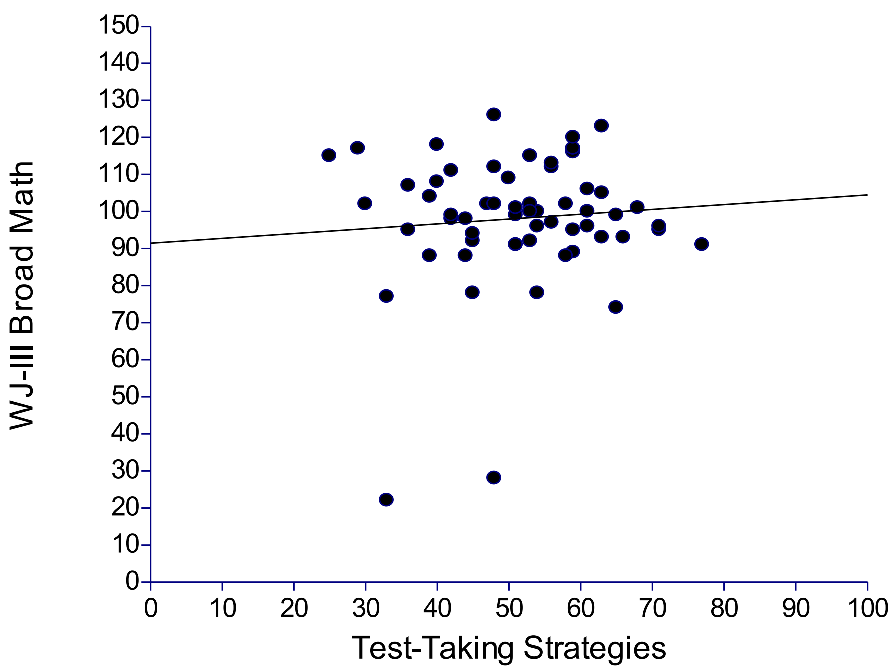

Figure C5e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Broad Math, Third Grade

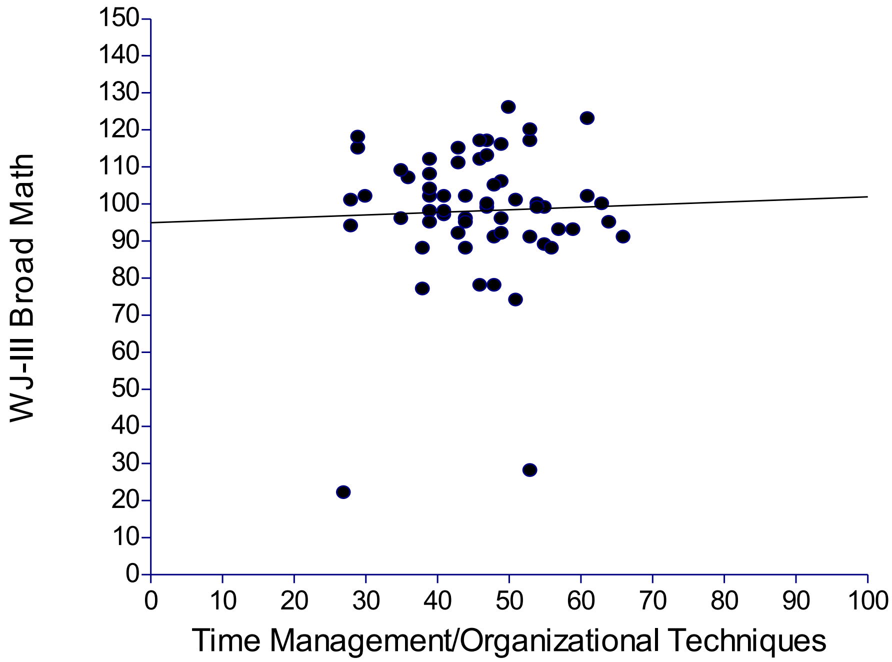

Figure C5f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Broad Math, Third Grade

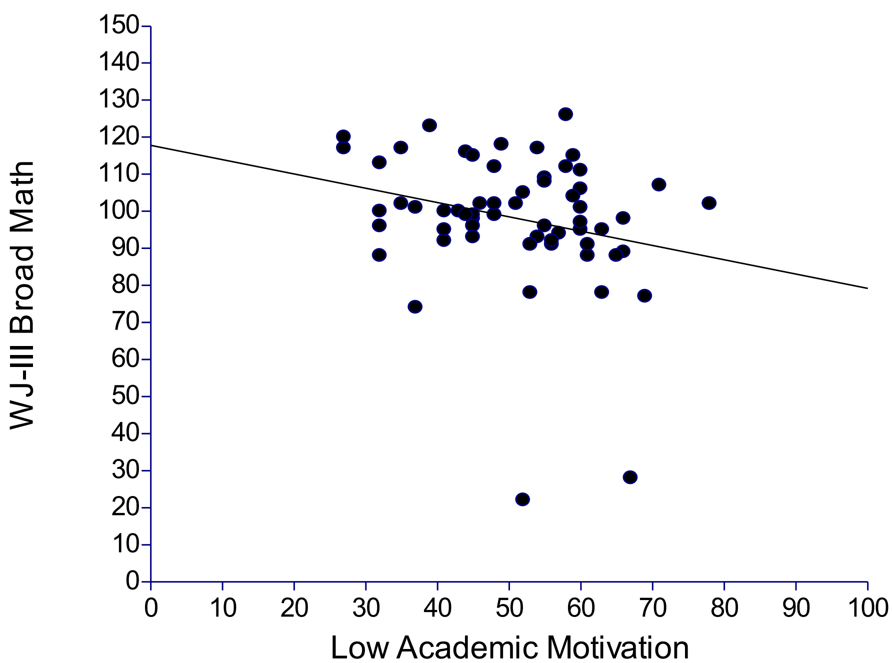

Figure C5g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Broad Math, Third Grade

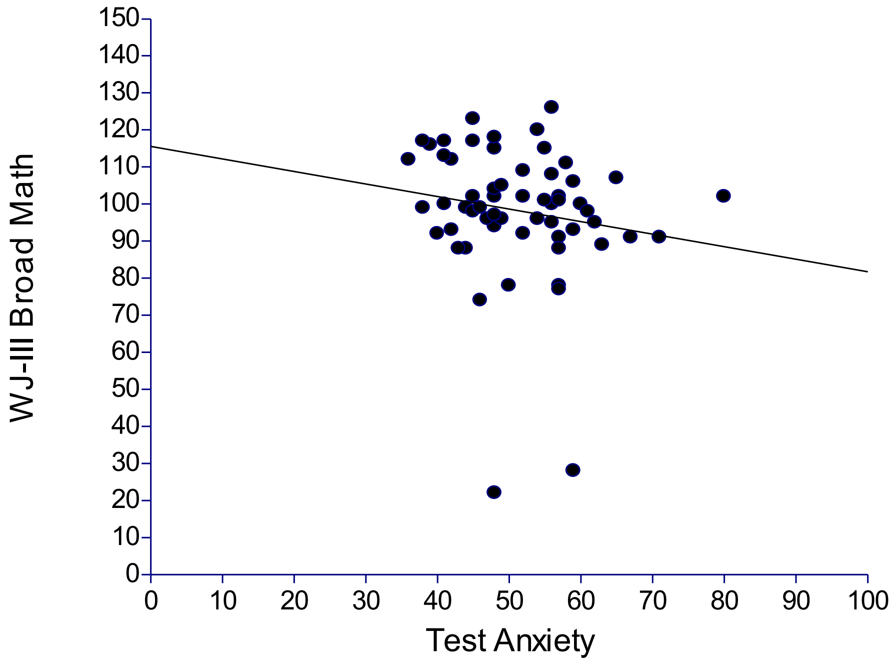

Figure C5h. Scatterplot for SMALSI Test Anxiety and WJ-III Broad Math, Third Grade

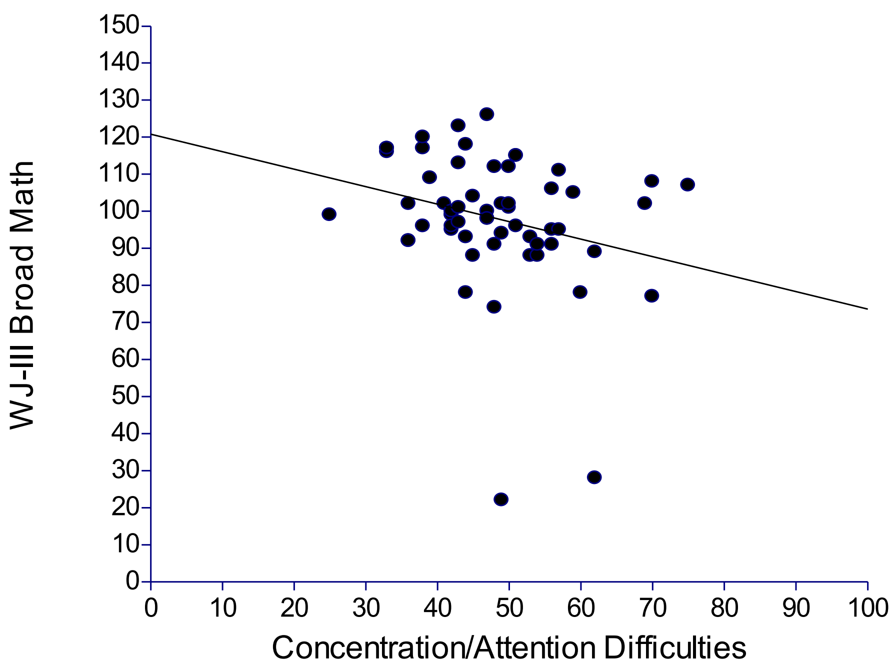

Figure C5i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Broad Math, Third Grade

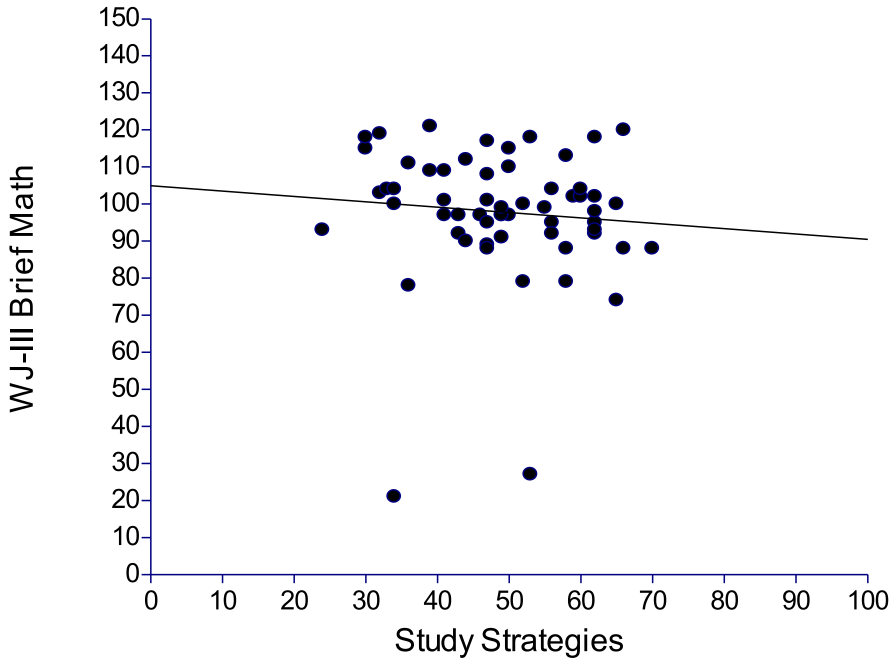

Figure C6a. Scatterplot for SMALSI Study Strategies and WJ-III Brief Math, Third Grade

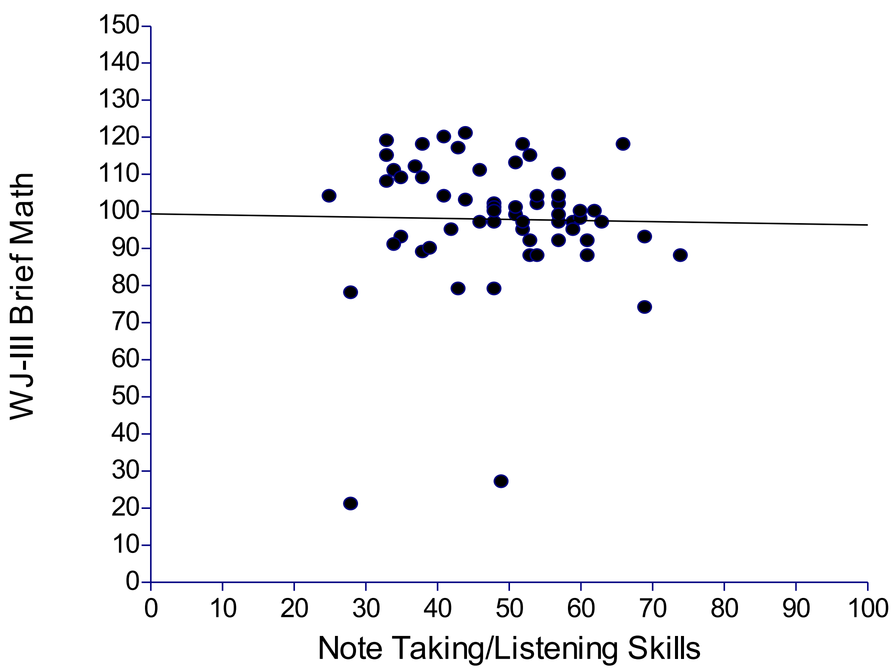

Figure C6b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Brief Math, Third Grade

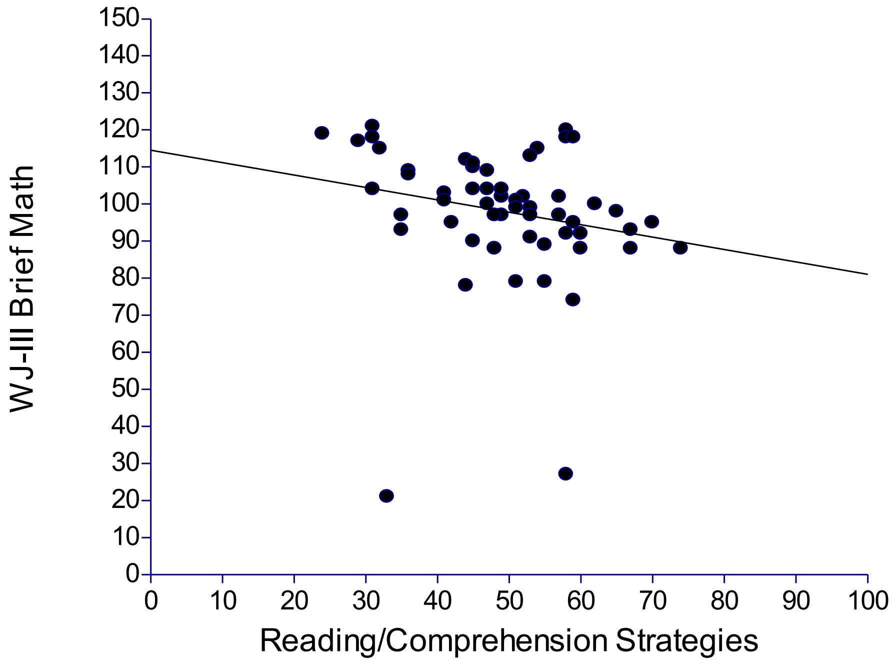

Figure C6c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Brief Math, Third Grade

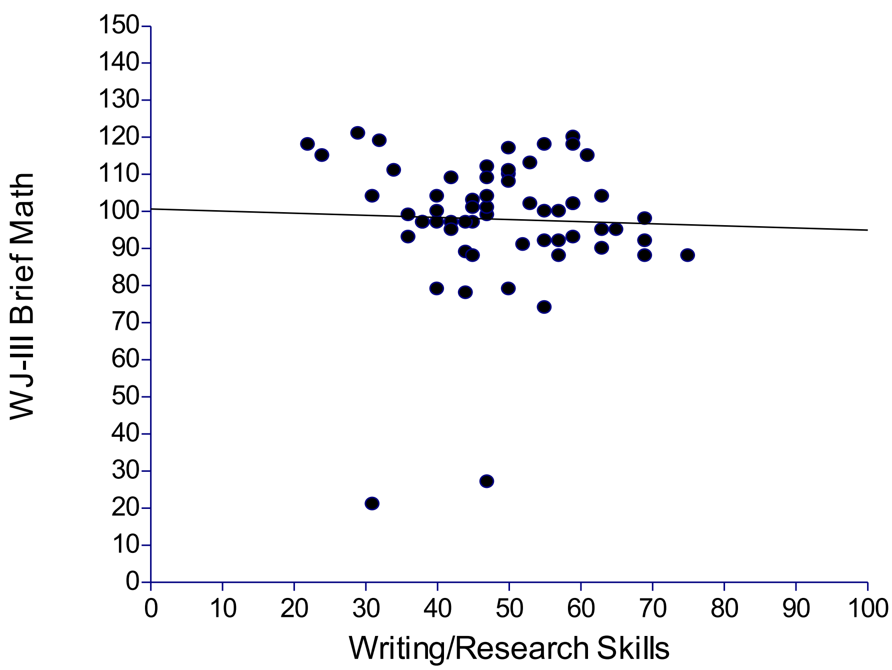

Figure C6d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Brief Math, Third Grade

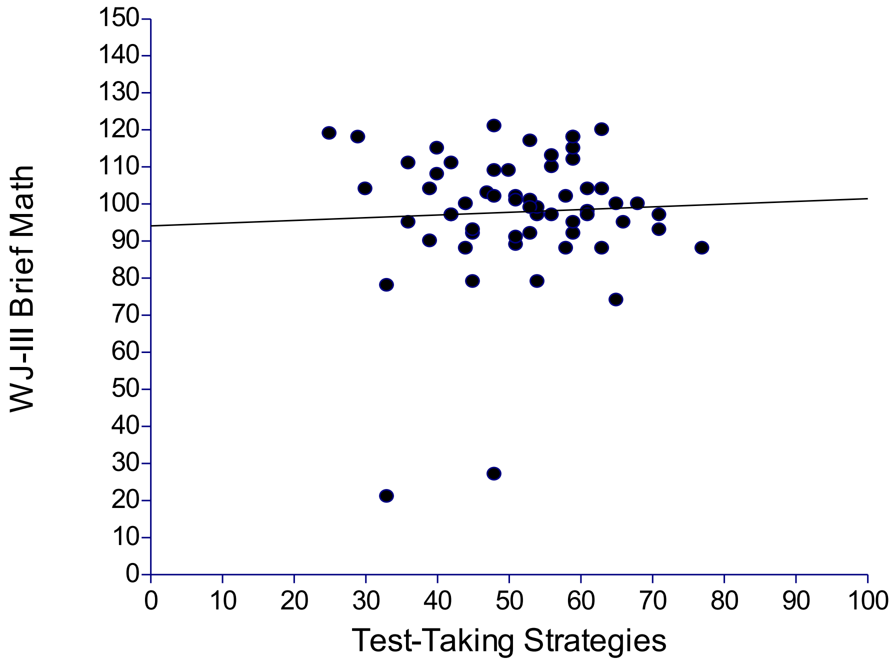

Figure C6e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Brief Math, Third Grade

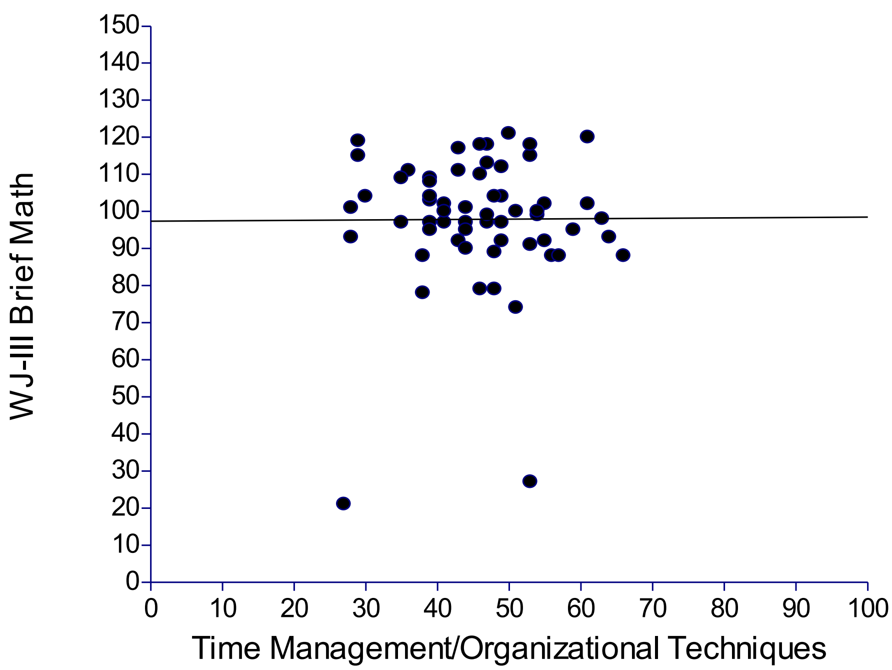

Figure C6f. Scatterplot for SMALSI Time Management/Organizational Techniques, Third Grade

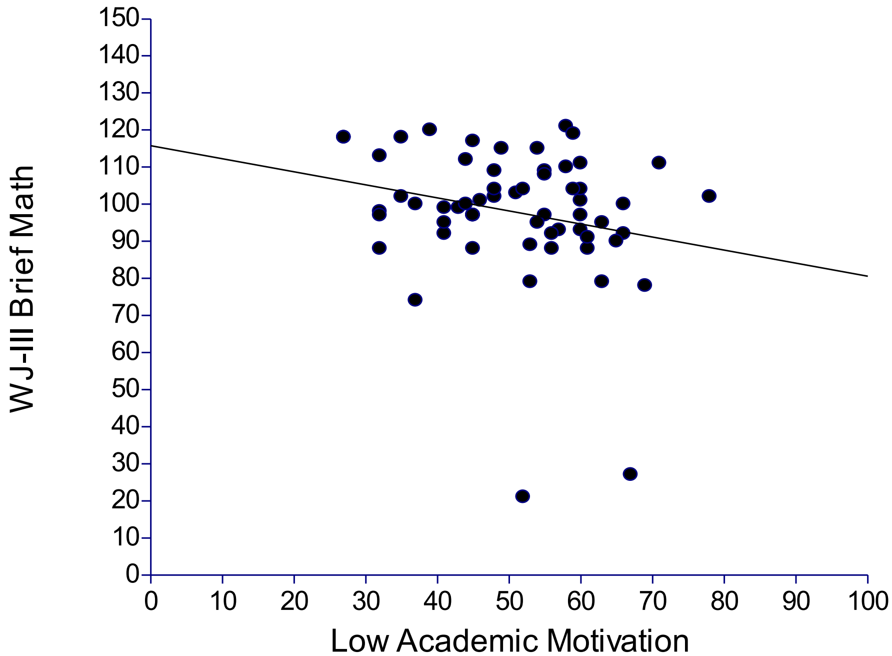

Figure C6g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Brief Math, Third Grade

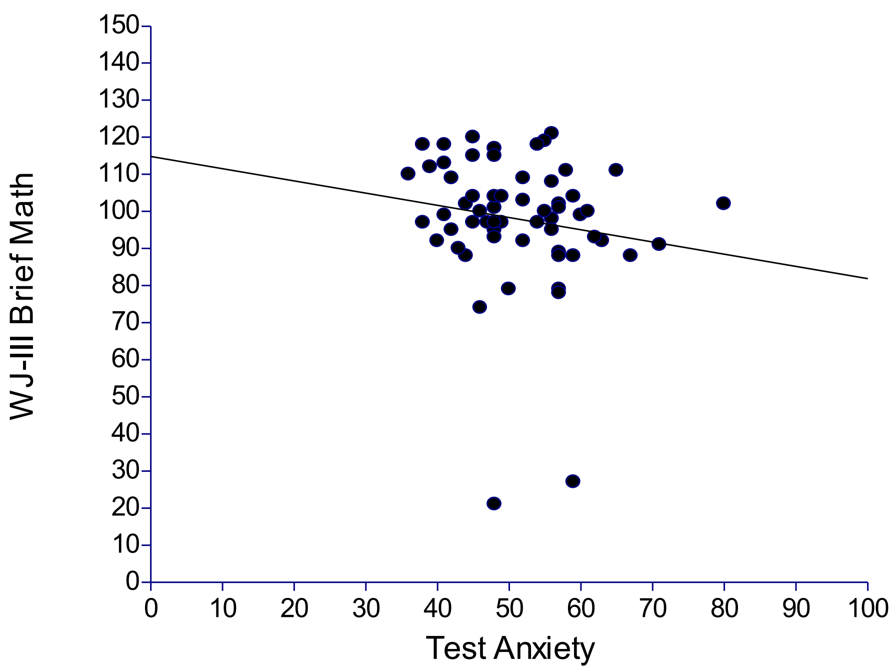

Figure C6h. Scatterplot for SMALSI Test Anxiety and WJ-III Brief Math, Third Grade

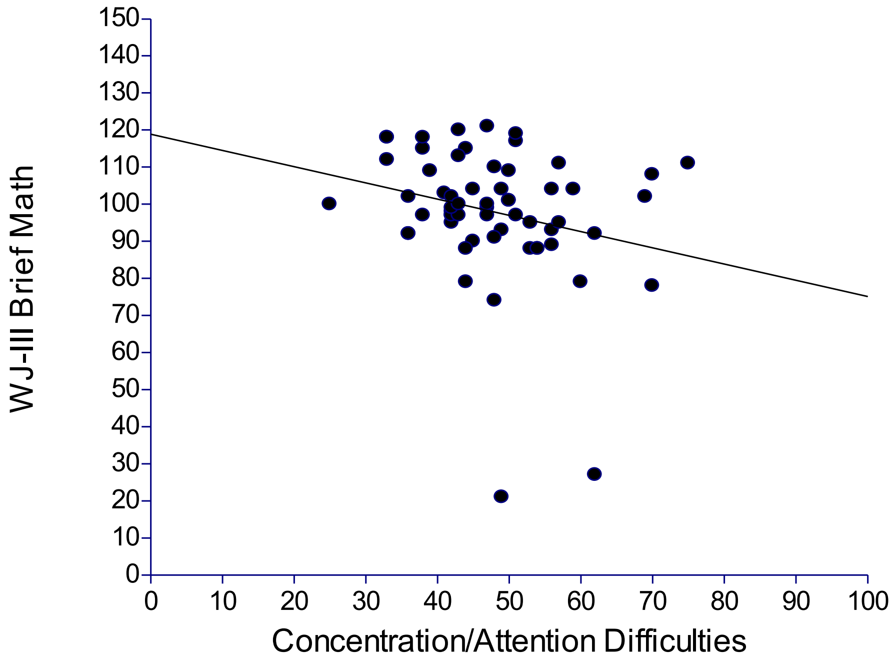

Figure C6i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Brief Math, Third Grade

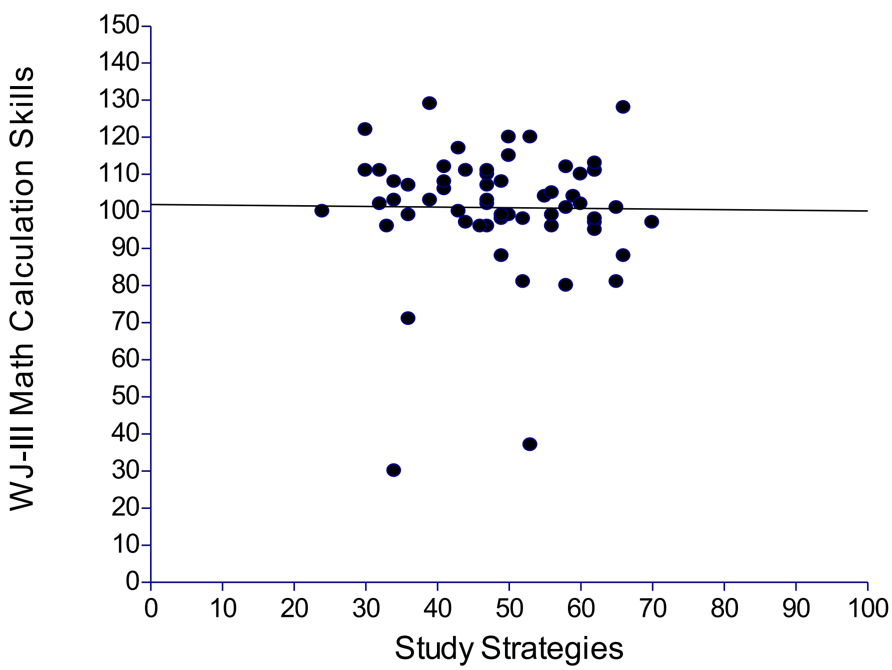

Figure C7a. Scatterplot for SMALSI Study Strategies and WJ-III Math Calculation Skills, Third Grade

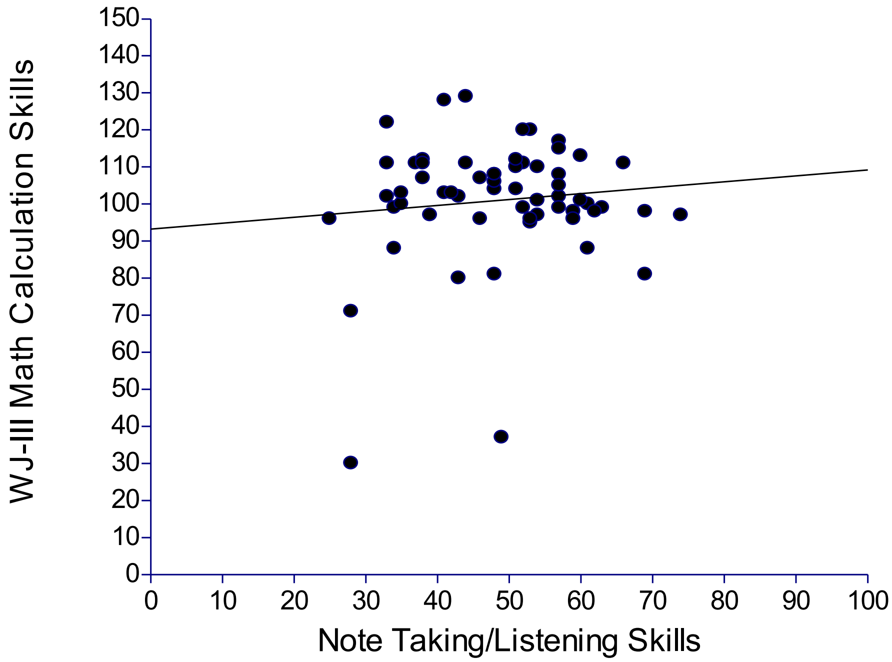

Figure C7b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Calculation Skills, Third Grade

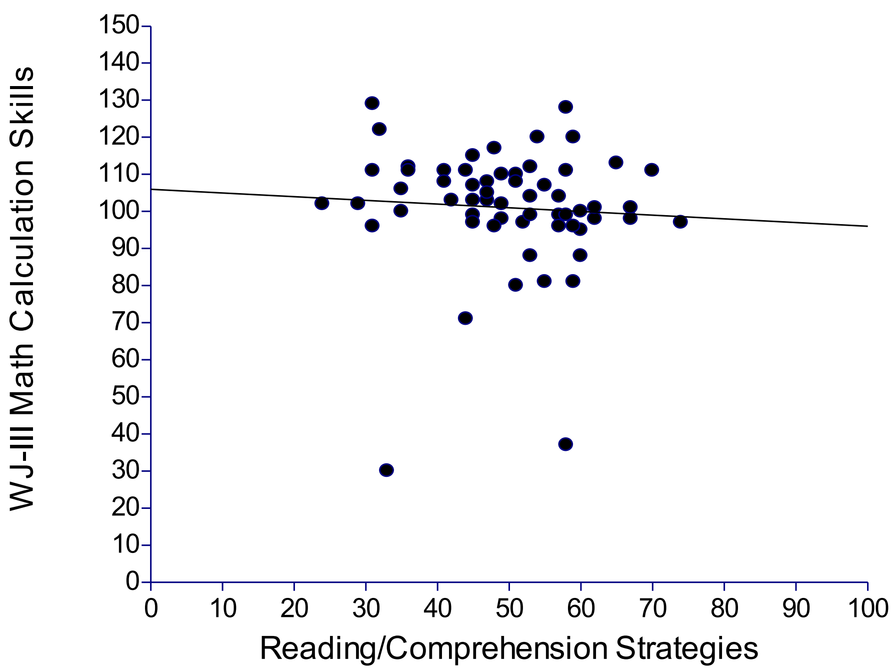

Figure C7c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Calculation Skills, Third Grade

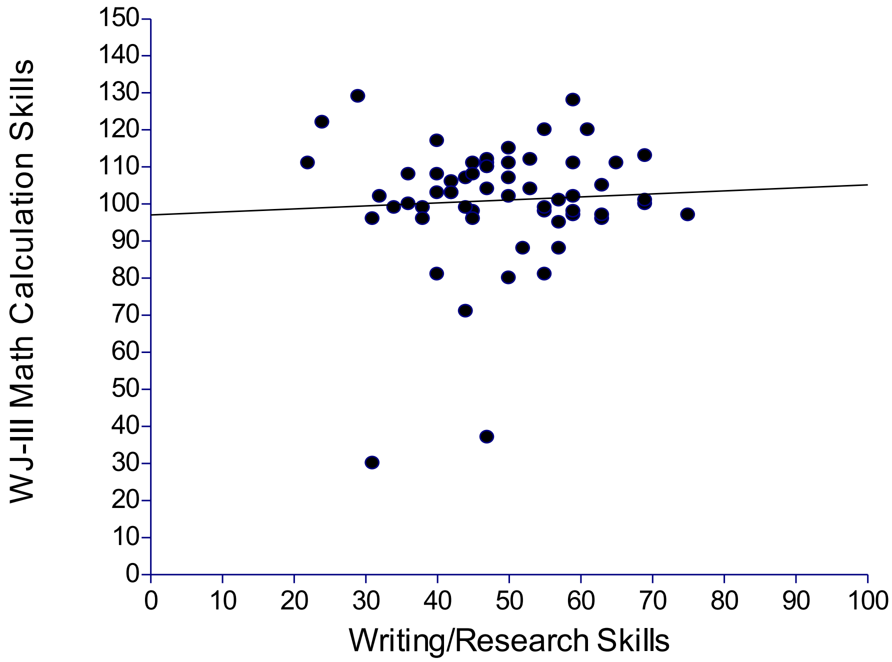

Figure C7d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Calculation Skills, Third Grade

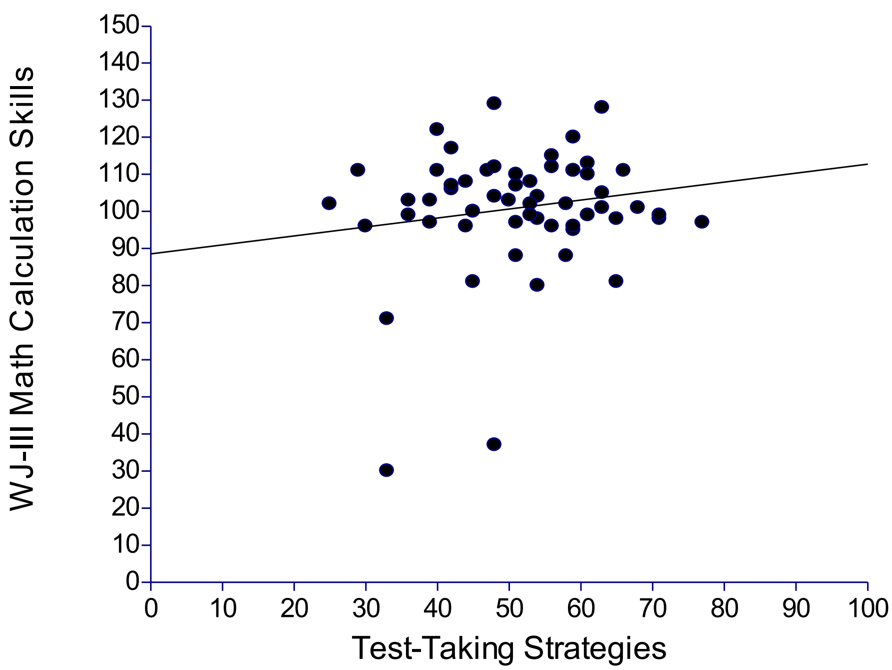

Figure C7e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Calculation Skills, Third Grade

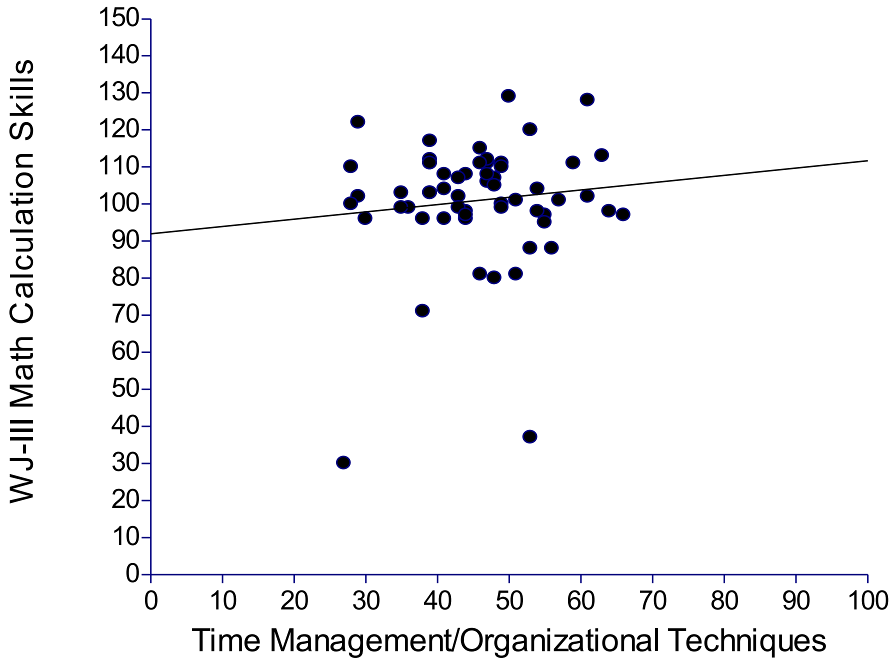

Figure C7f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Calculation Skills, Third Grade

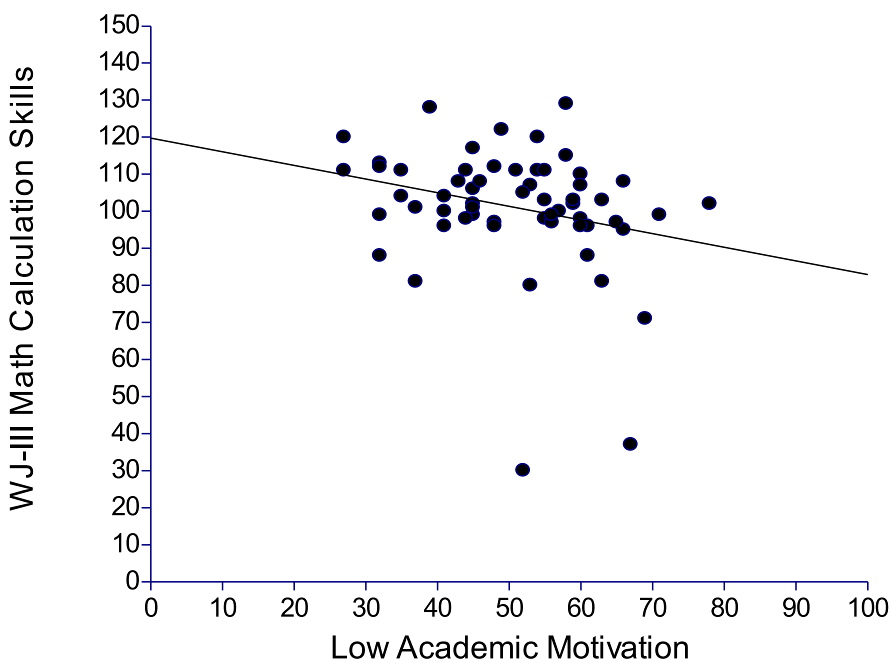

Figure C7g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Calculation Skills, Third Grade

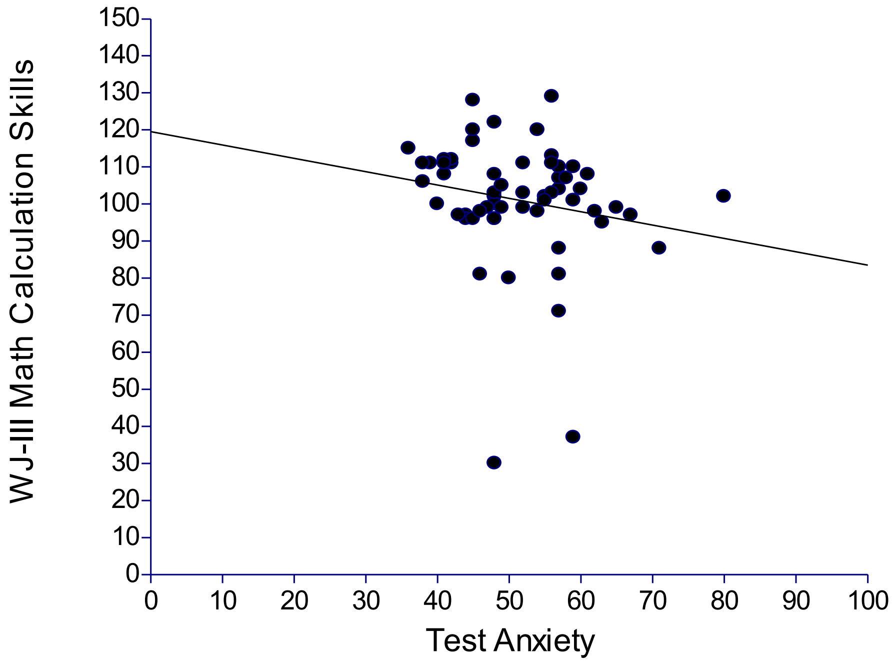

Figure C7h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Calculation Skills, Third Grade

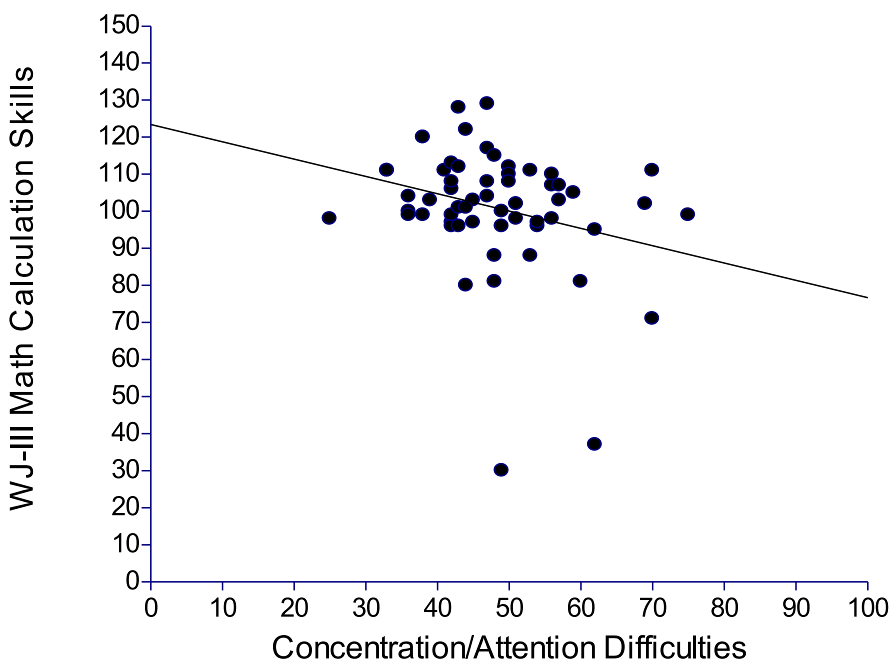

Figure C7i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Calculation Skills, Third Grade

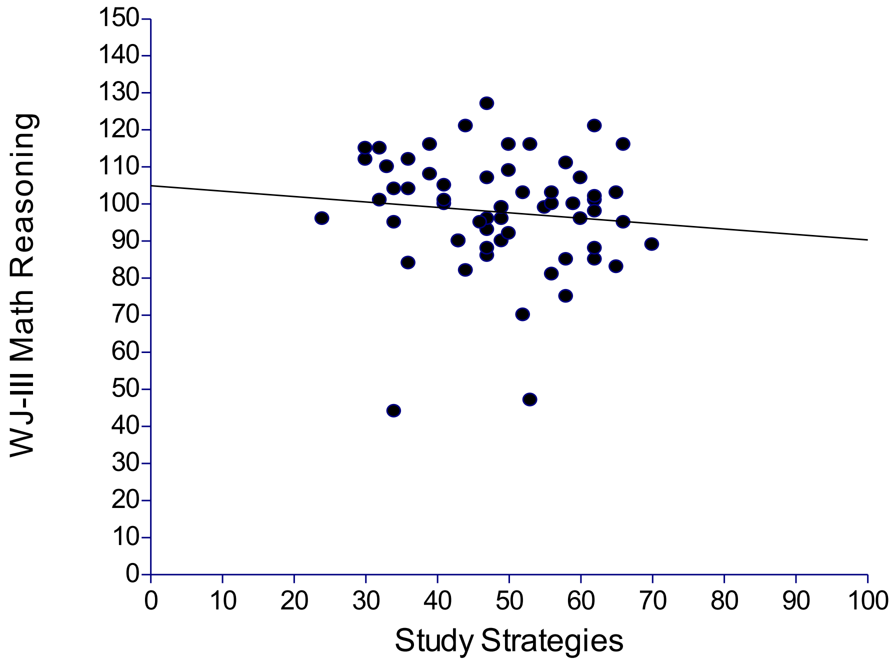

Figure C8a. Scatterplot for SMALSI Study Strategies and WJ-III Math Reasoning, Third Grade

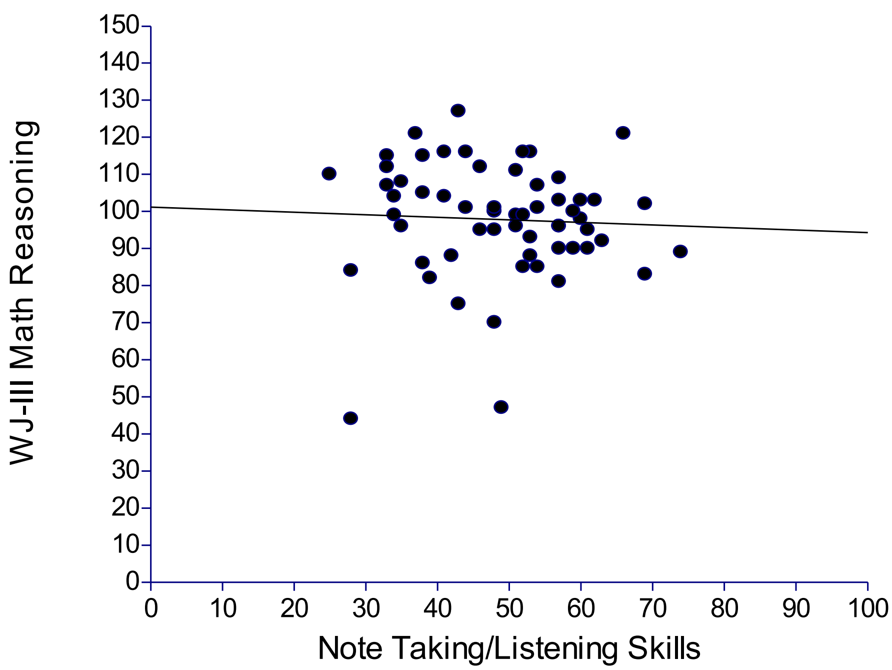

Figure C8b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Reasoning, Third Grade

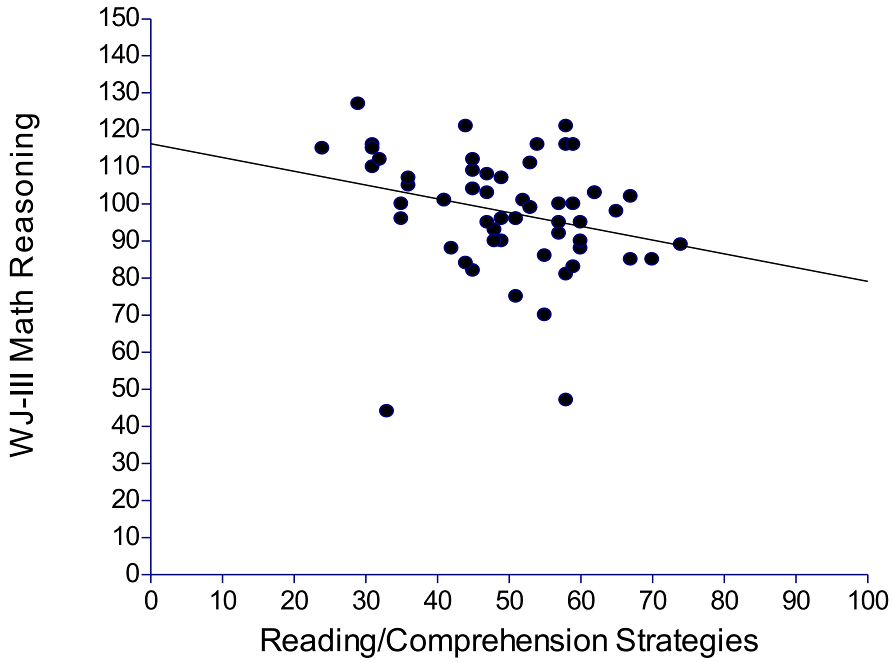

Figure C8c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Reasoning, Third Grade

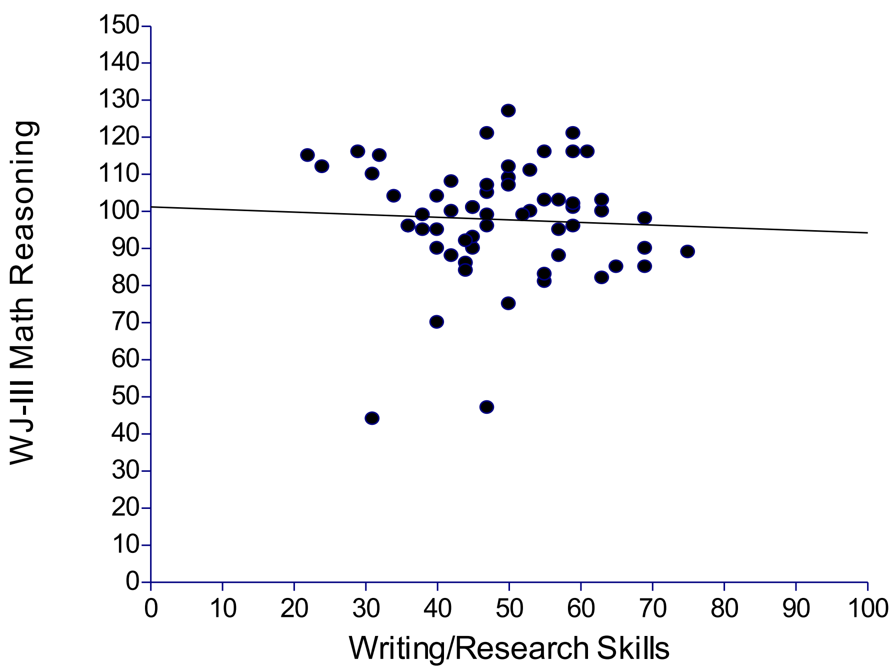

Figure C8d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Reasoning, Third Grade

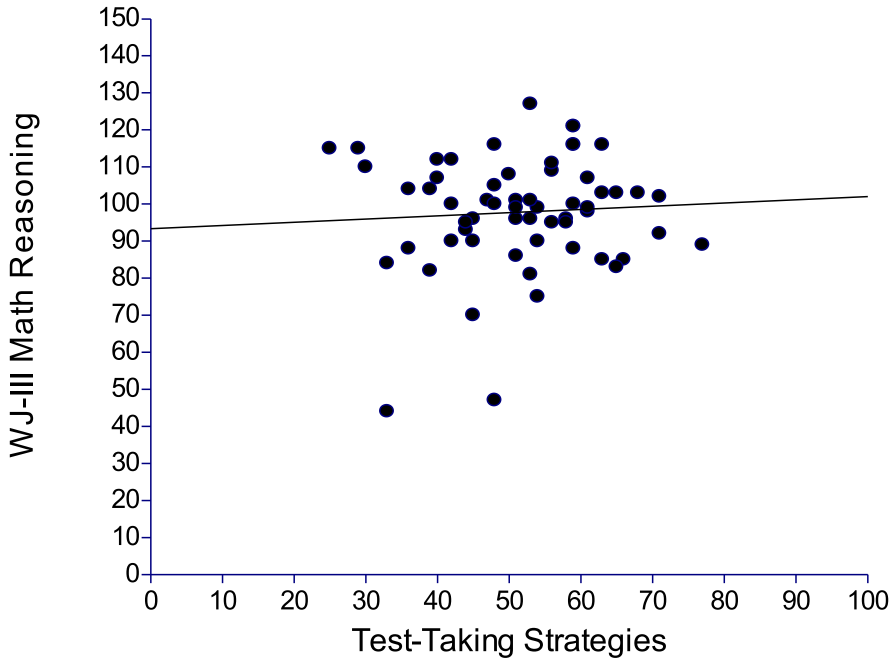

Figure C8e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Reasoning, Third Grade

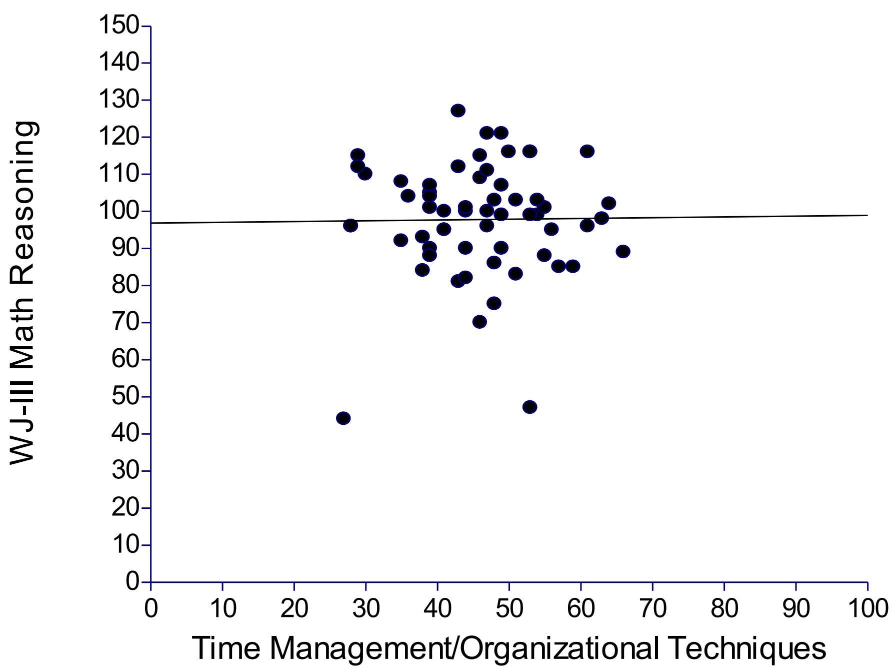

Figure C8f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Reasoning, Third Grade

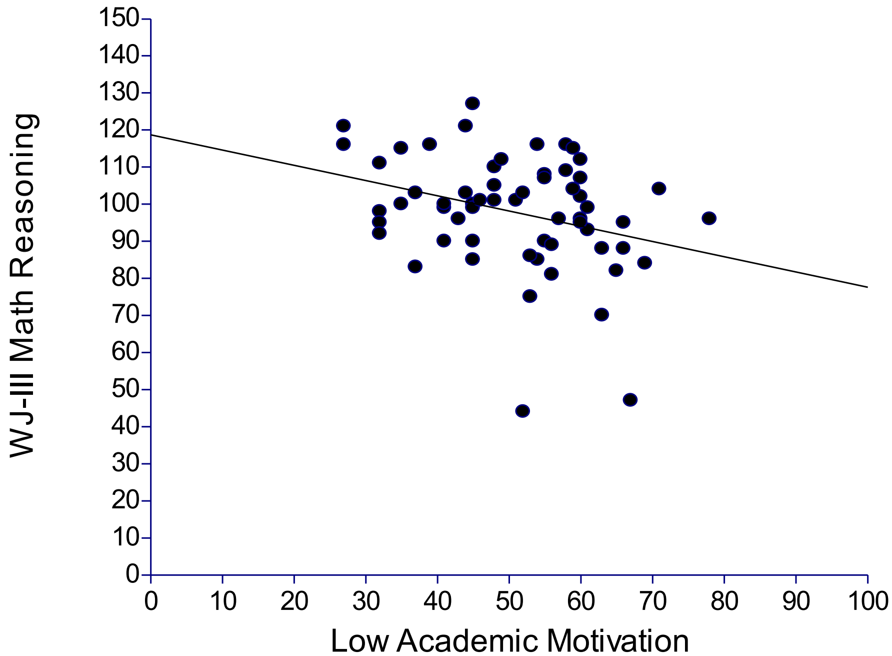

Figure C8g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Reasoning, Third Grade

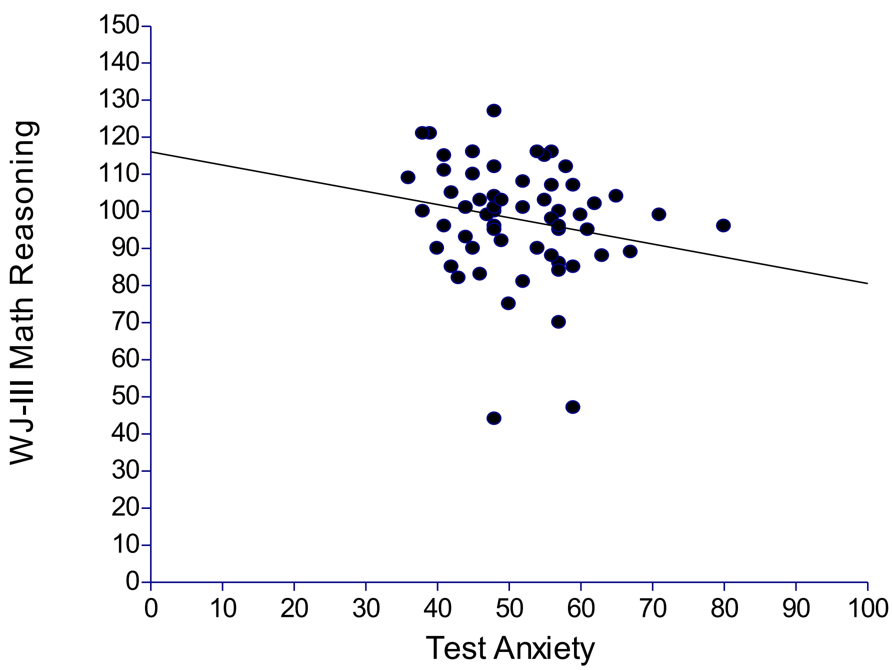

Figure C8h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Reasoning, Third Grade

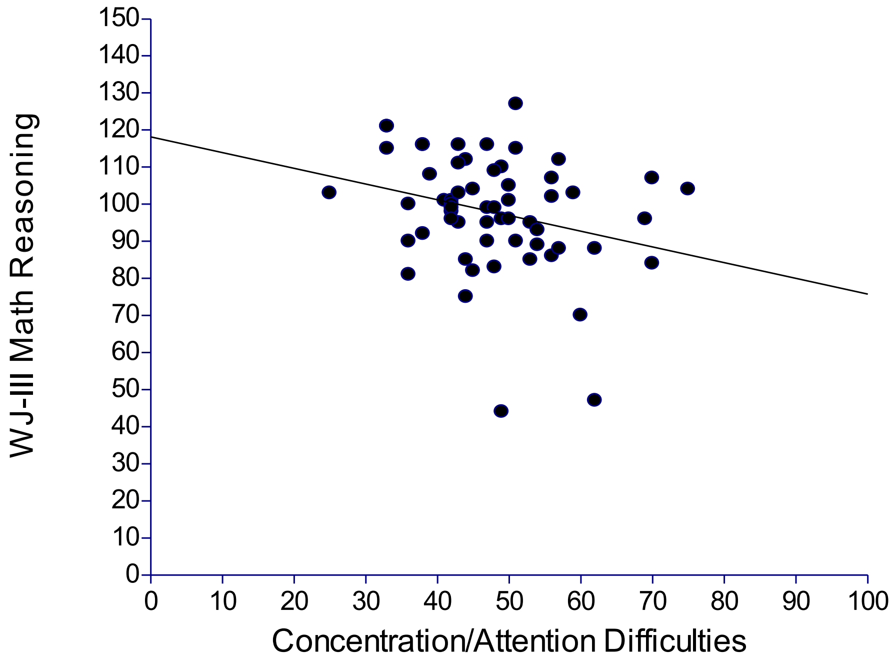

Figure C8i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Reasoning, Third Grade

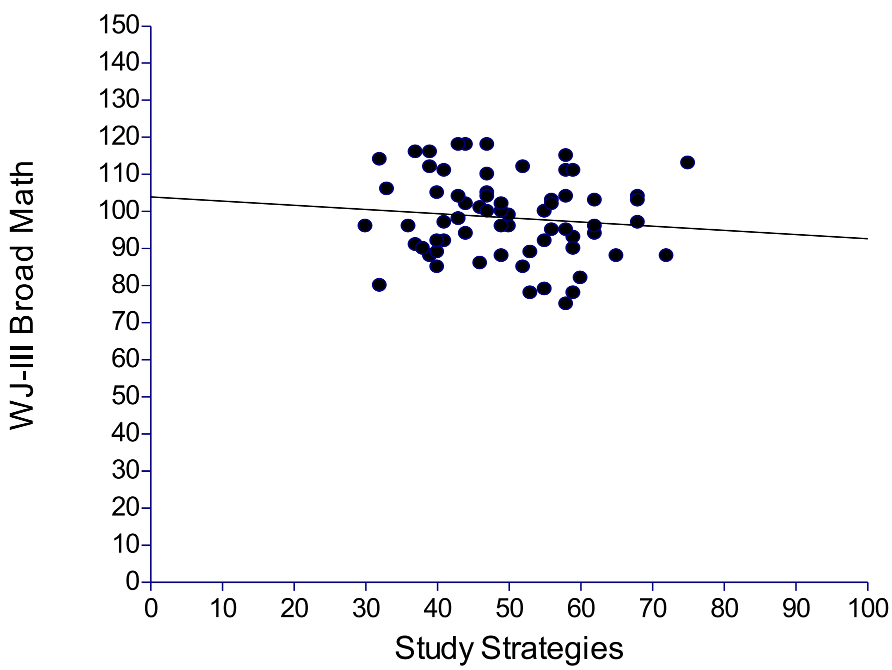

Figure C9a. Scatterplot for SMALSI Study Strategies and WJ-III Broad Math, Fourth Grade

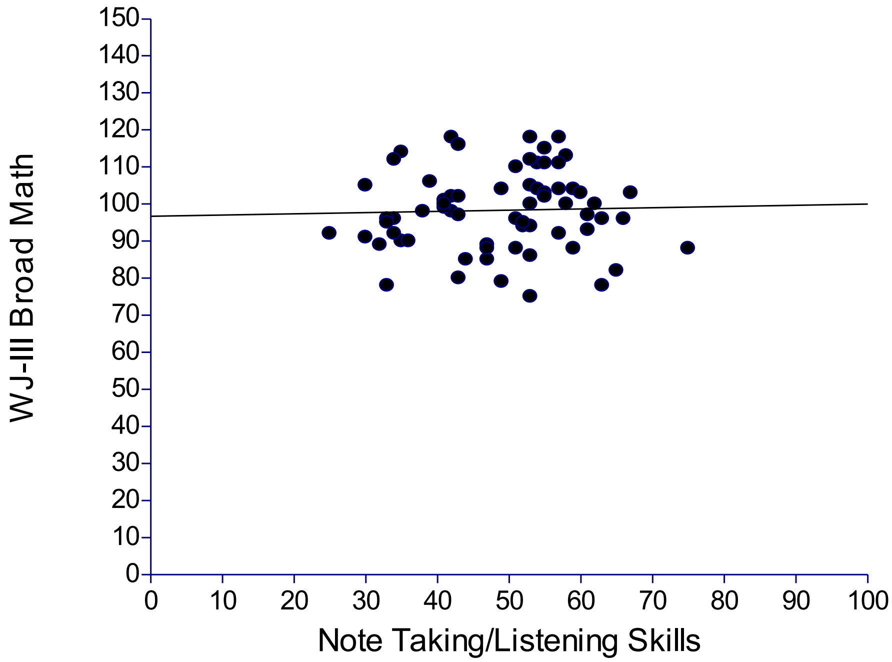

Figure C9b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Broad Math, Fourth Grade

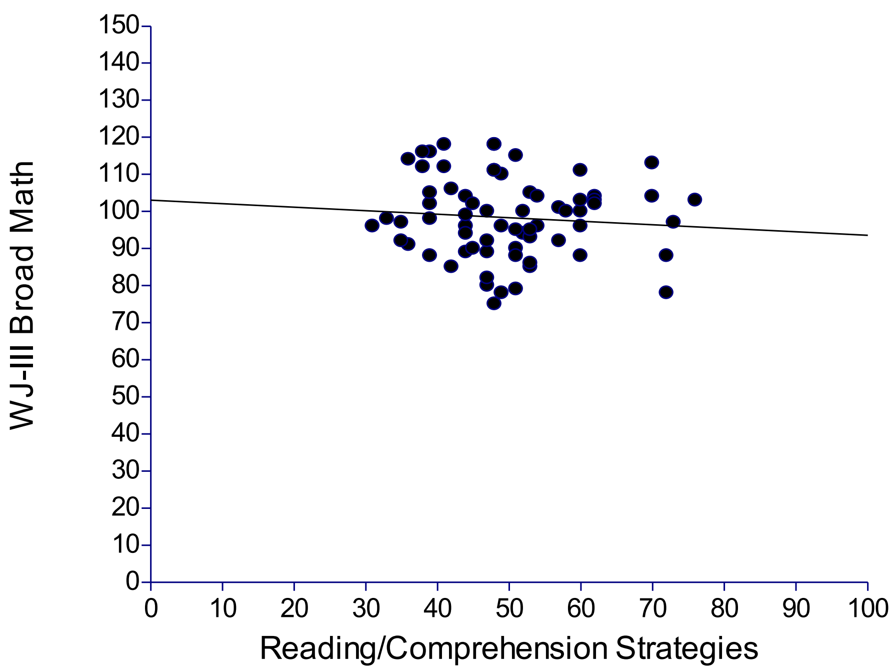

Figure C9c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Broad Math, Fourth Grade

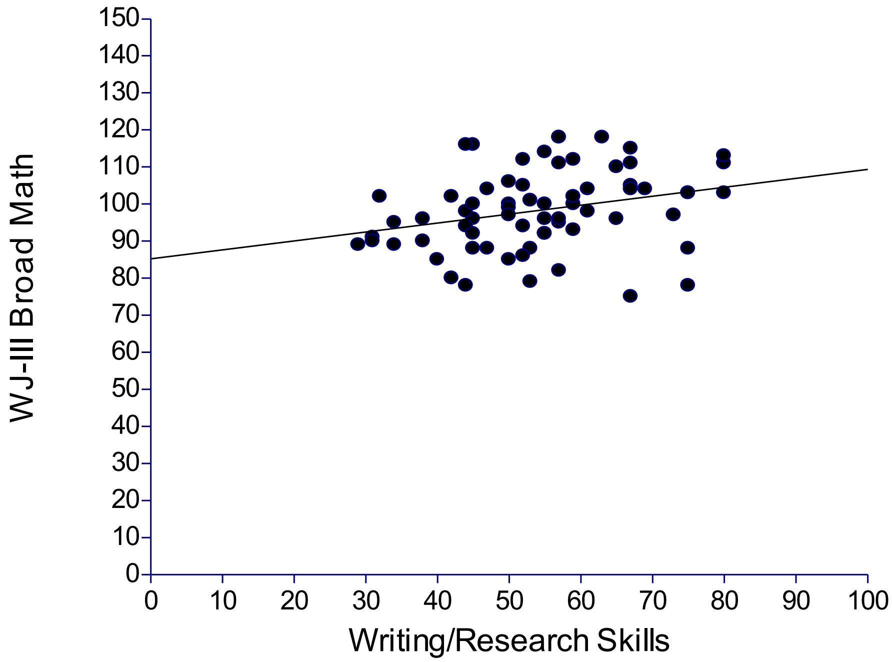

Figure C9d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Broad Math, Fourth Grade

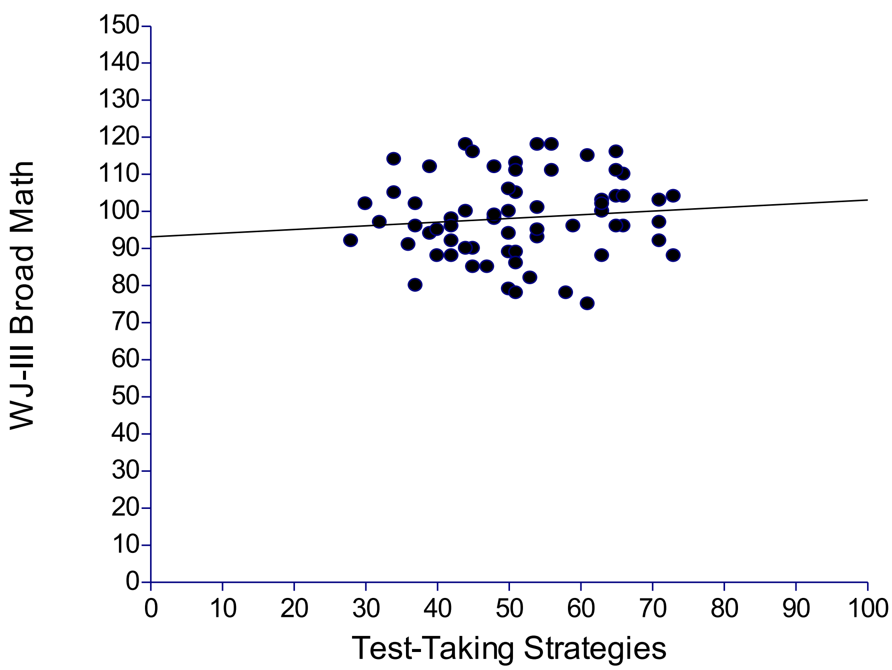

Figure C9e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Broad Math, Fourth Grade

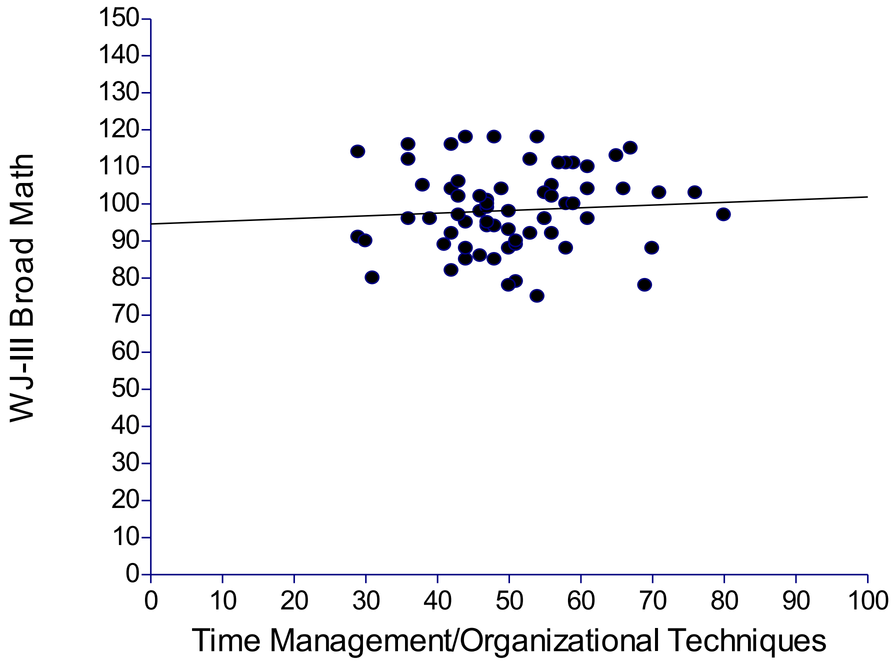

Figure C9f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Broad Math, Fourth Grade

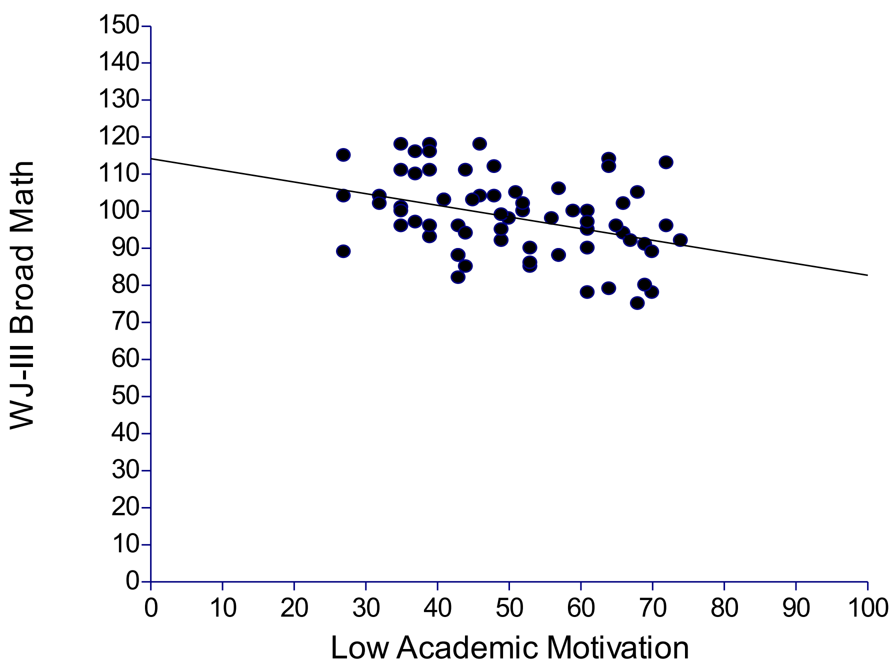

Figure C9g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Broad Math, Fourth Grade

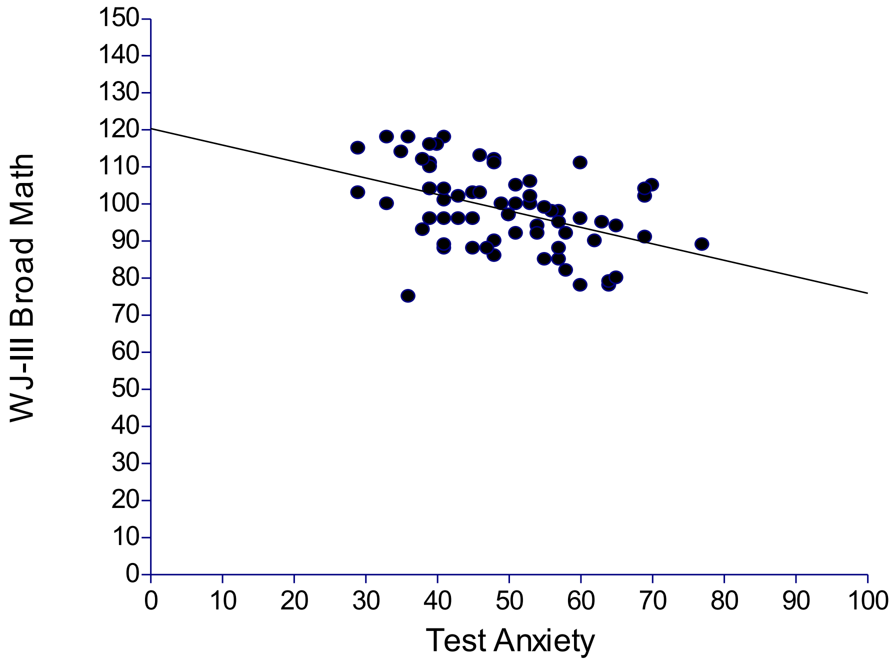

Figure C9h. Scatterplot for SMALSI Test Anxiety and WJ-III Broad Math, Fourth Grade

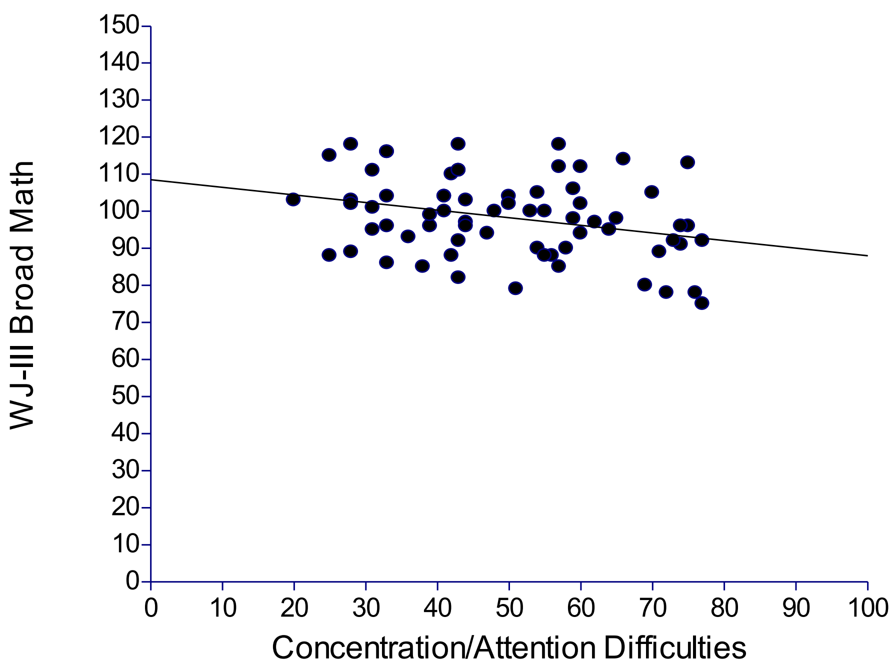

Figure C9i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Broad Math, Fourth Grade

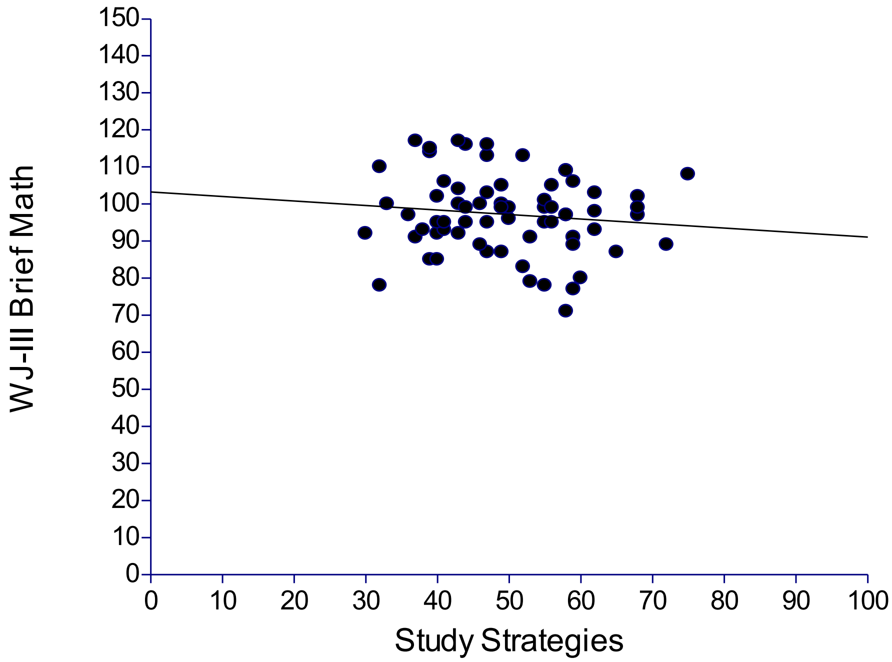

Figure C10a. Scatterplot for SMALSI Study Strategies and WJ-III Brief Math, Fourth Grade

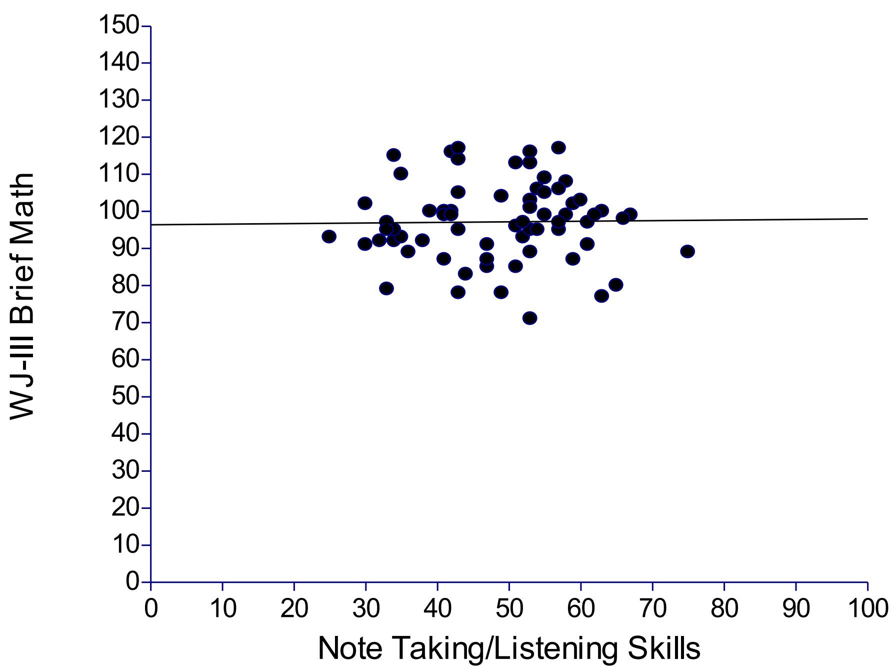

Figure C10b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Brief Math, Fourth Grade

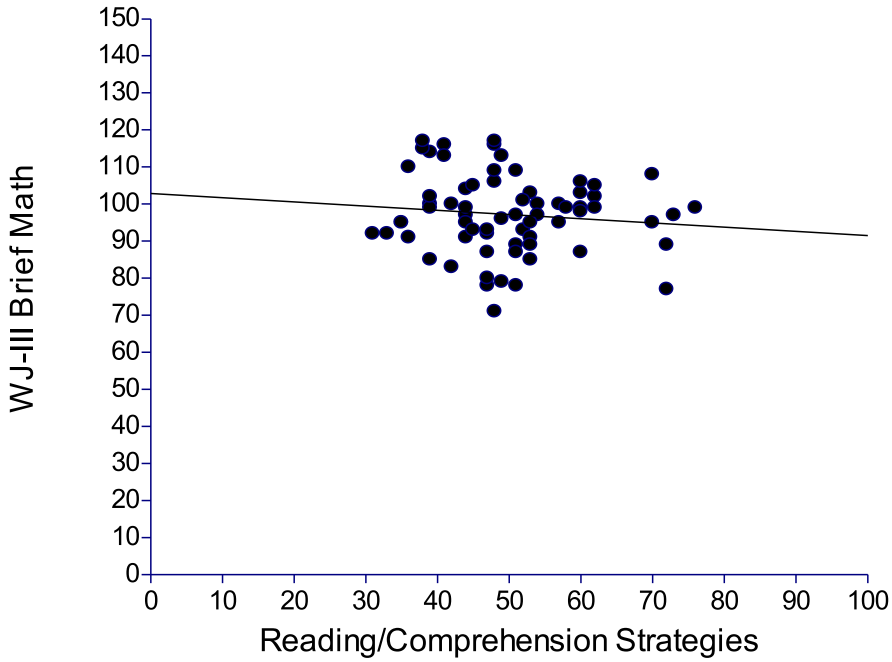

Figure C10c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Brief Math, Fourth Grade

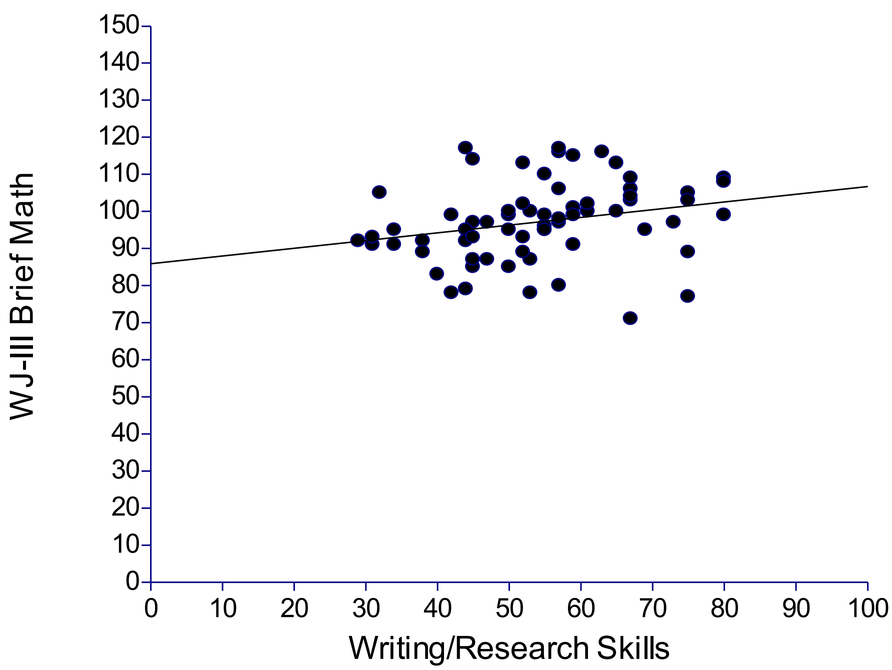

Figure C10d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Brief Math, Fourth Grade

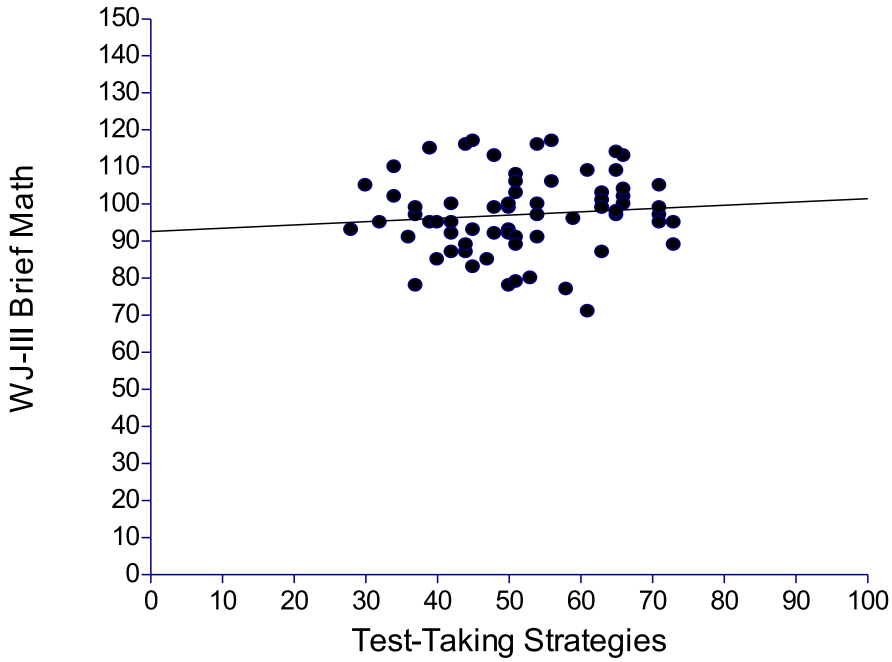

Figure C10e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Brief Math, Fourth Grade

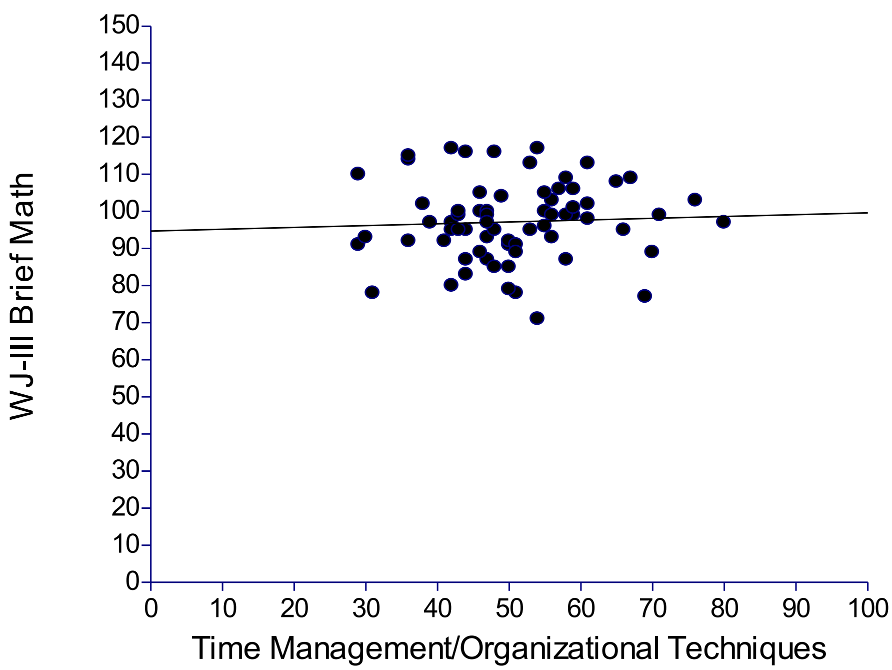

Figure C10f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Brief Math, Fourth Grade

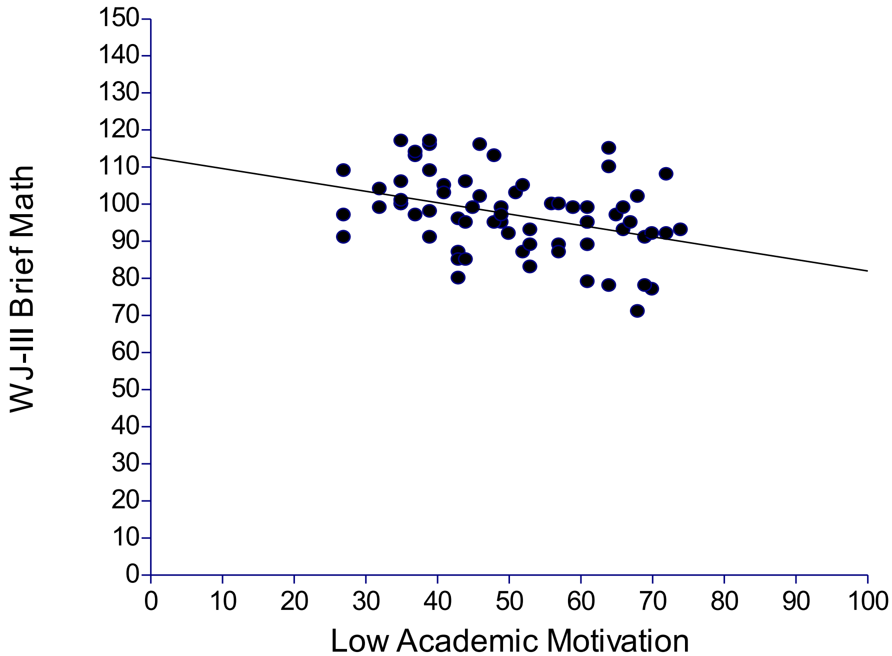

Figure C10g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Brief Math, Fourth Grade

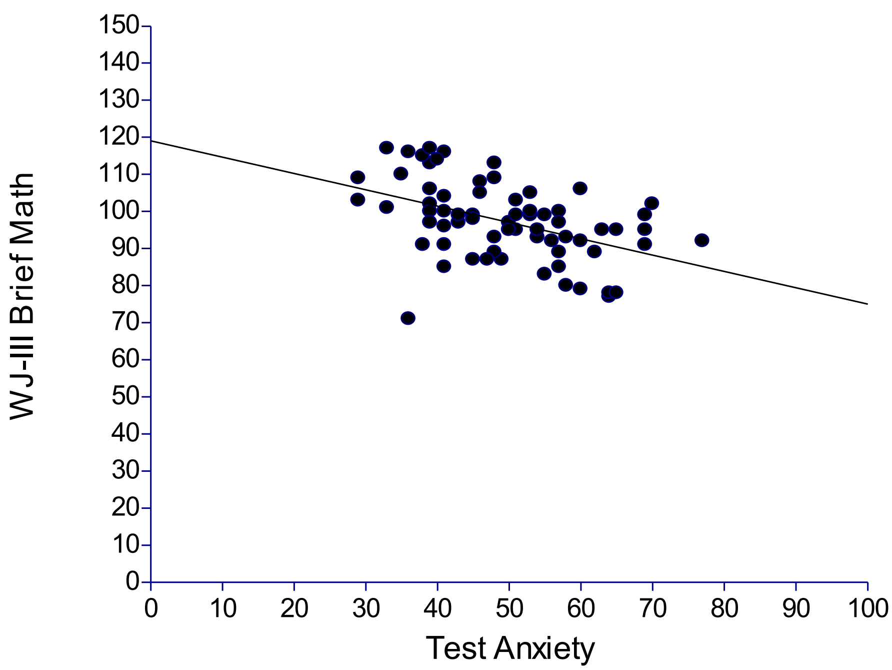

Figure C10h. Scatterplot for SMALSI Test Anxiety and WJ-III Brief Math, Fourth Grade

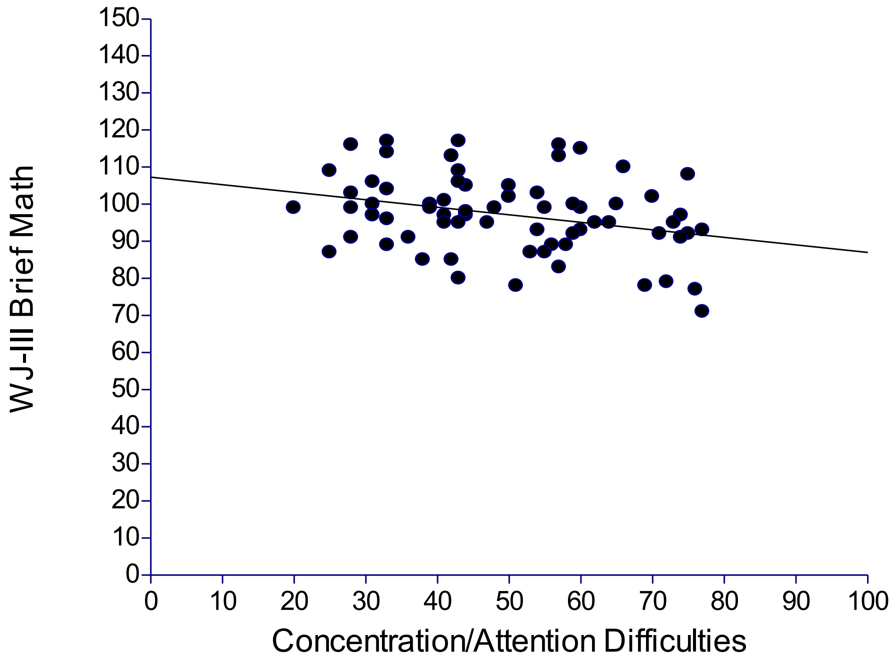

Figure C10i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Brief Math, Fourth Grade

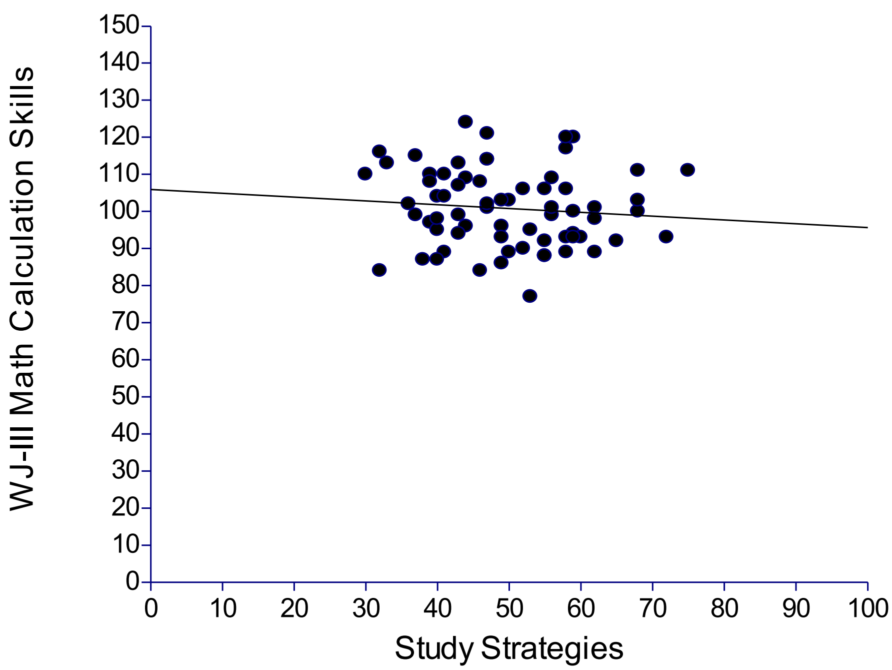

Figure C11a. Scatterplot for SMALSI Study Strategies and WJ-III Math Calculation Skills, Fourth Grade

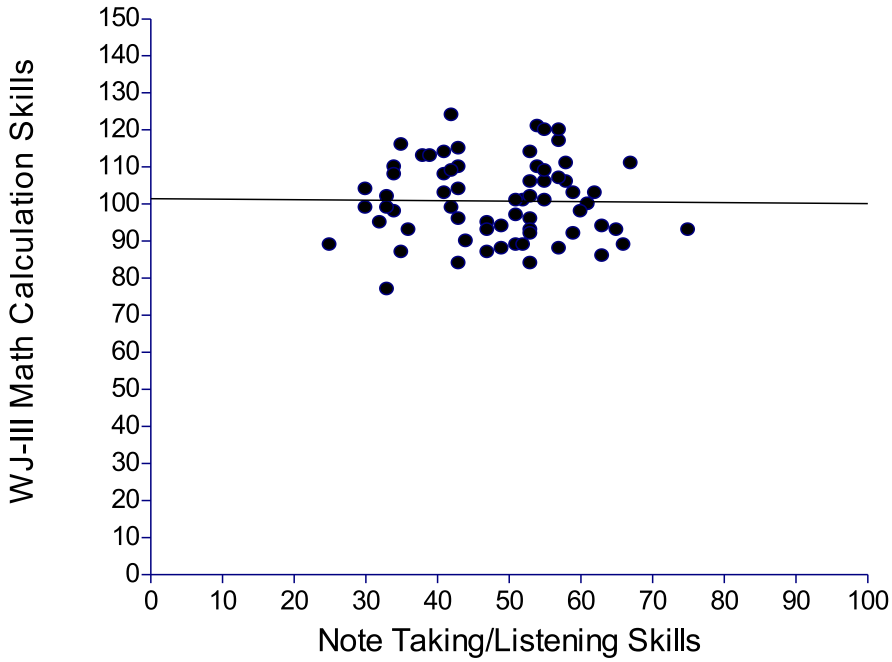

Figure C11b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Calculation Skills, Fourth Grade

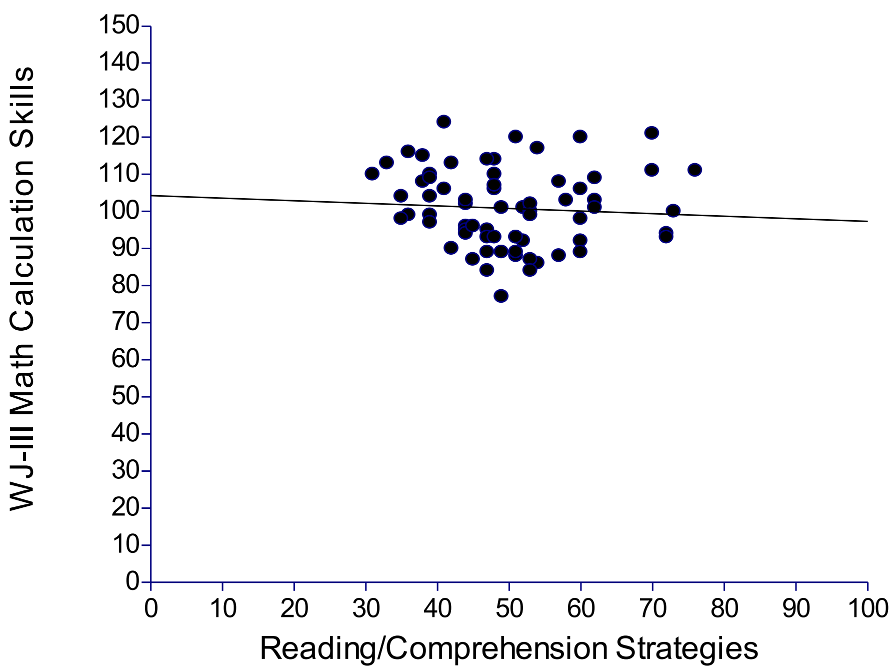

Figure C11c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Calculation Skills, Fourth Grade

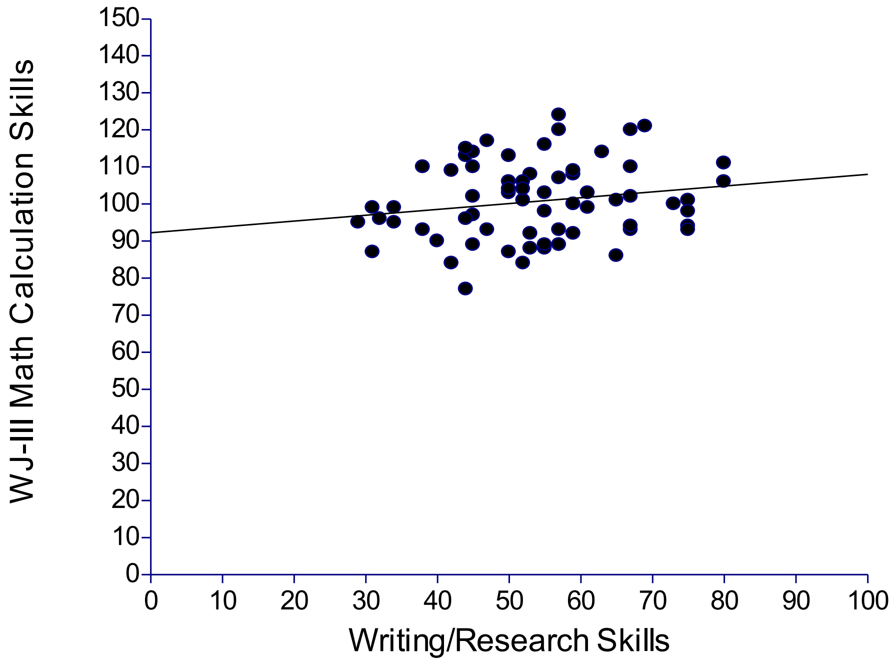

Figure C11d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Calculation Skills, Fourth Grade

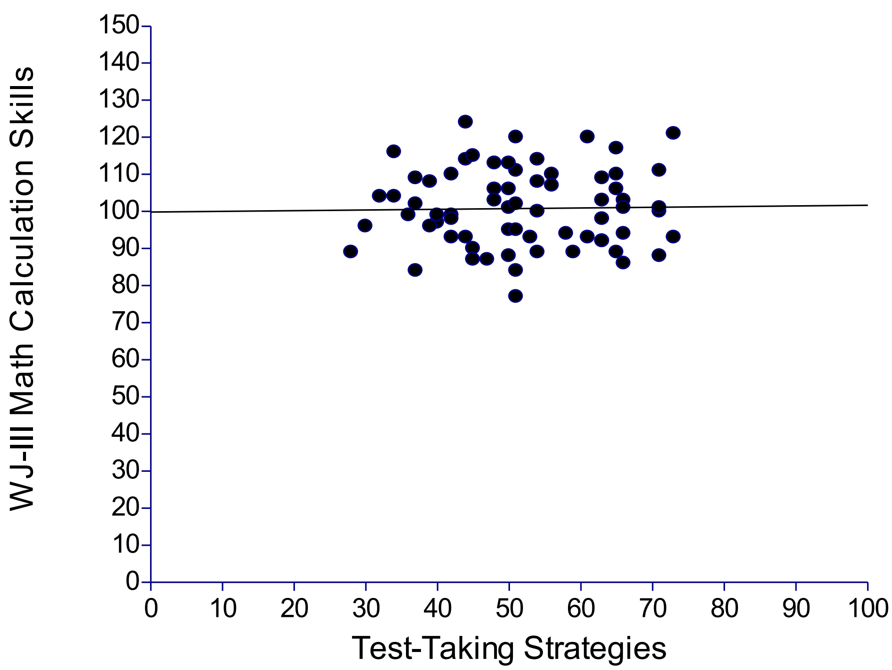

Figure C11e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Calculation Skills, Fourth Grade

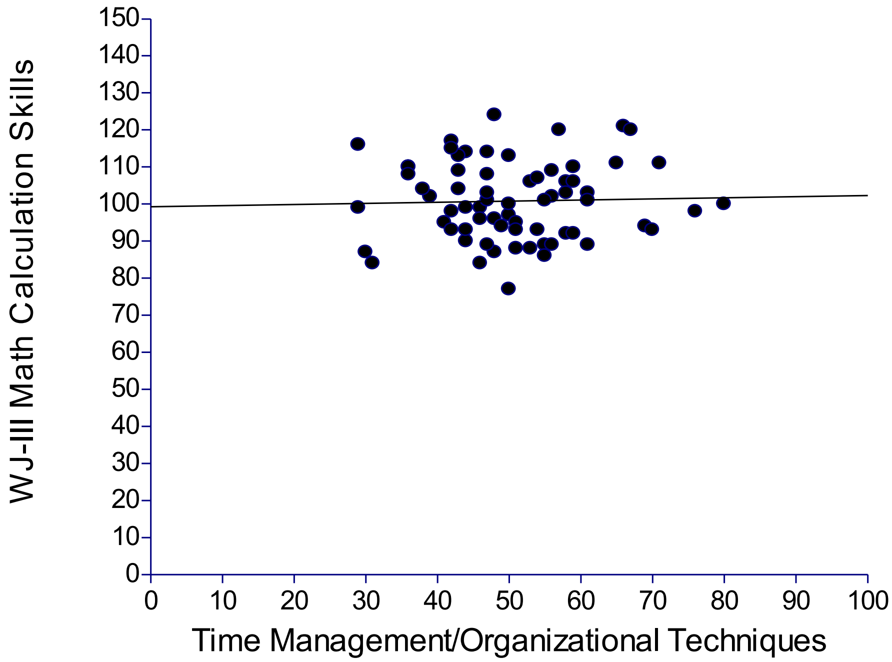

Figure C11f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Calculation Skills, Fourth Grade

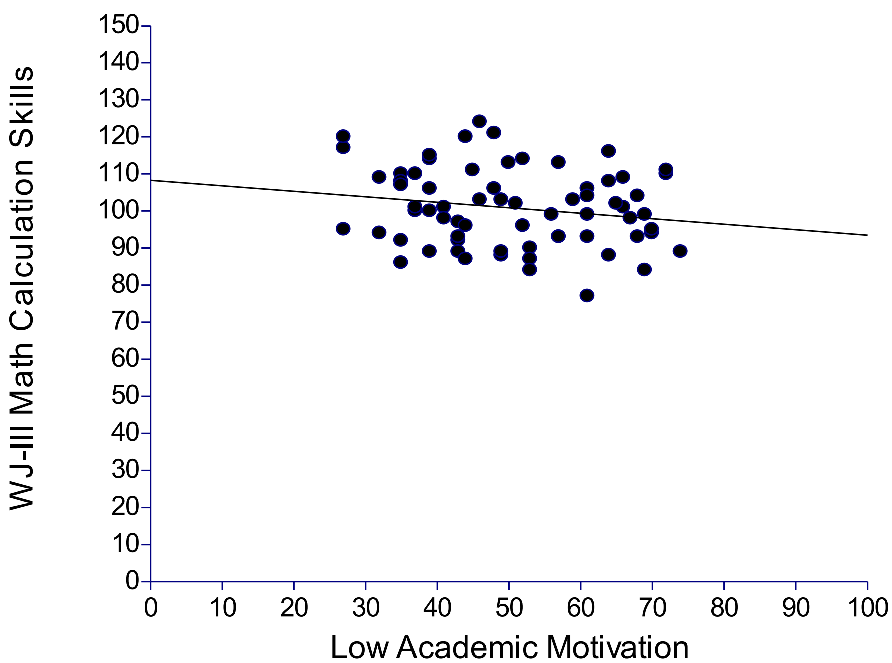

Figure C11g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Calculation Skills, Fourth Grade

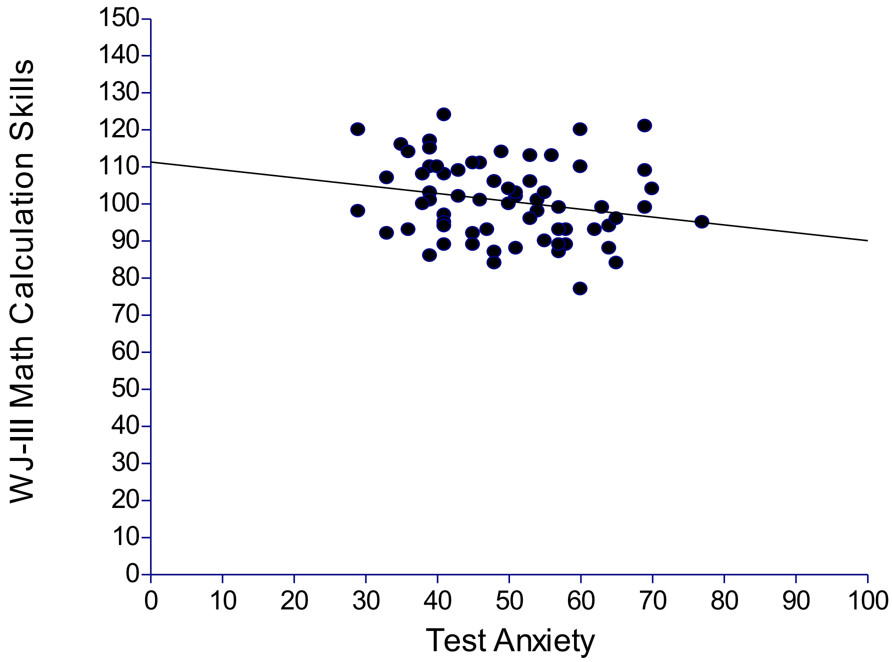

Figure C11h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Calculation Skills, Fourth Grade

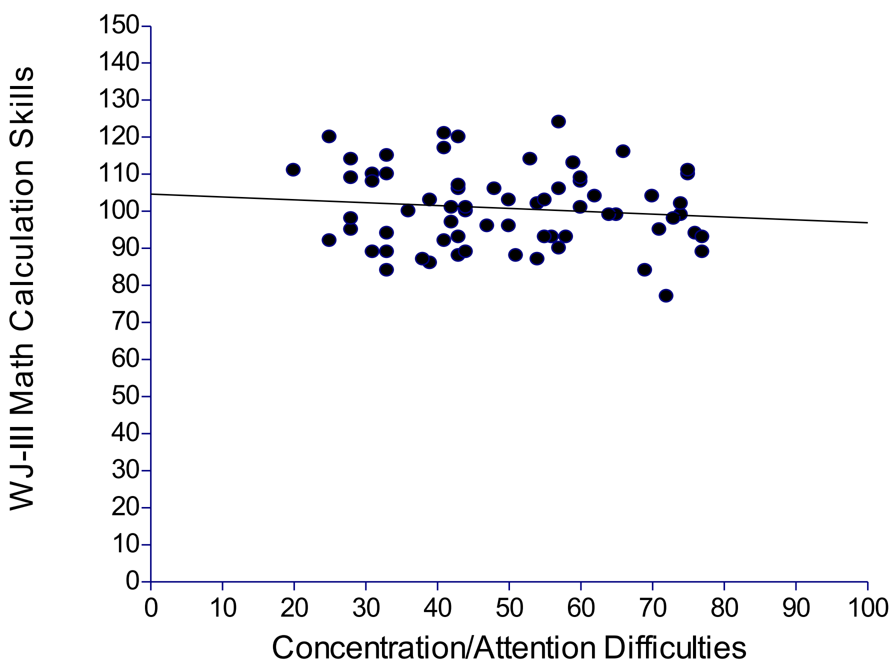

Figure C11i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Calculation Skills, Fourth Grade

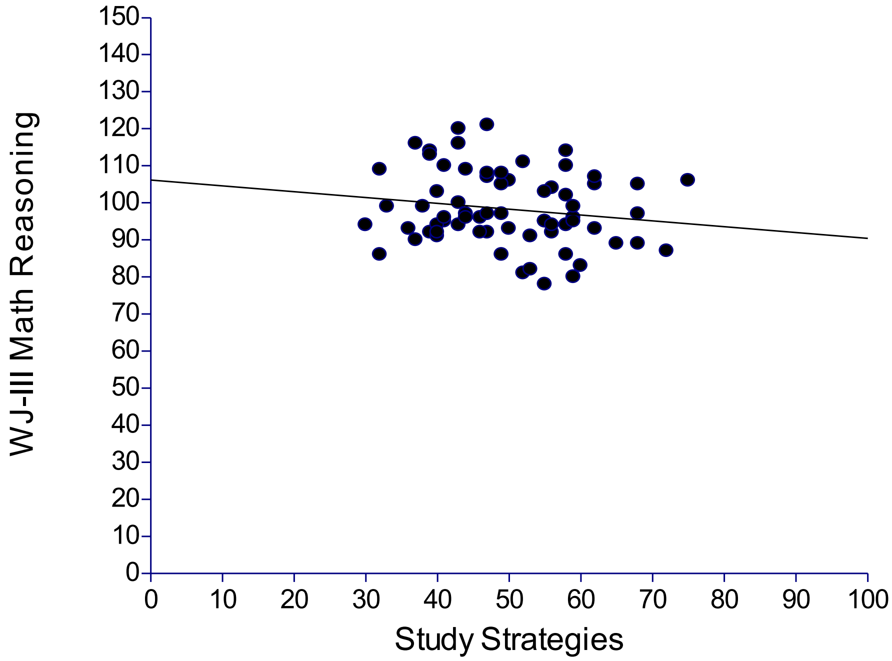

Figure C12a. Scatterplot for SMALSI Study Strategies and WJ-III Math Reasoning, Fourth Grade

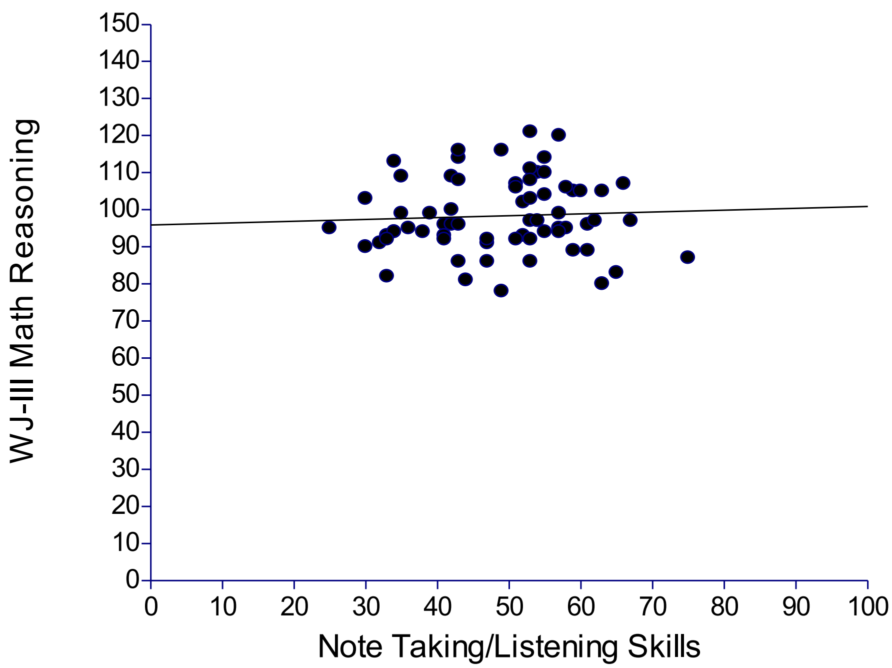

Figure C12b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Reasoning, Fourth Grade

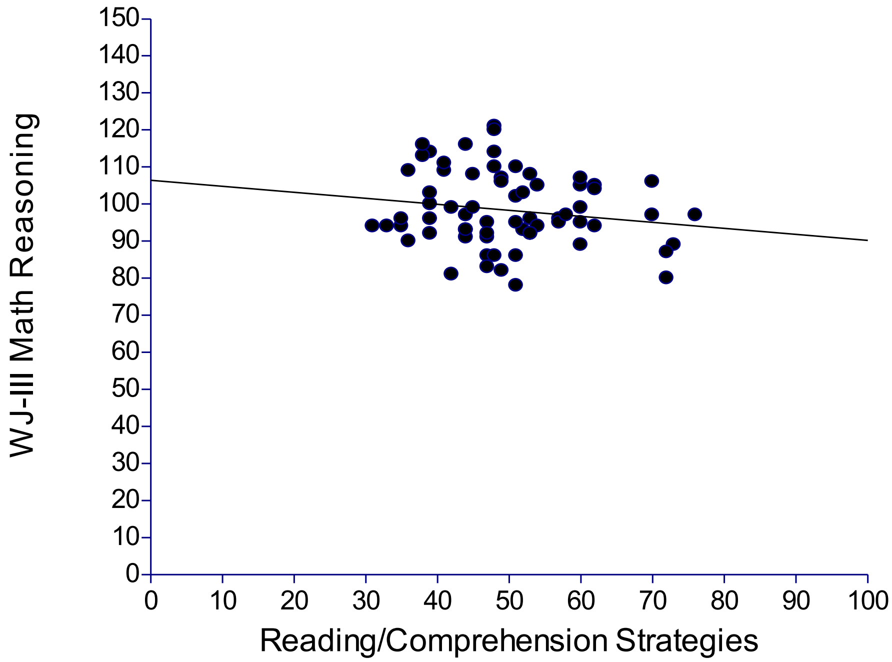

Figure C12c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Reasoning, Fourth Grade

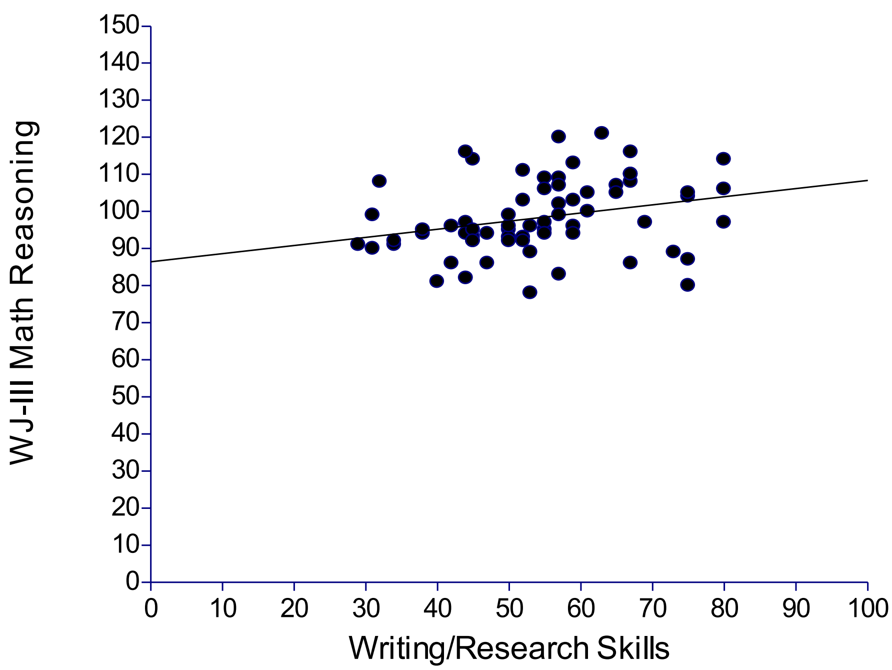

Figure C12d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Reasoning, Fourth Grade

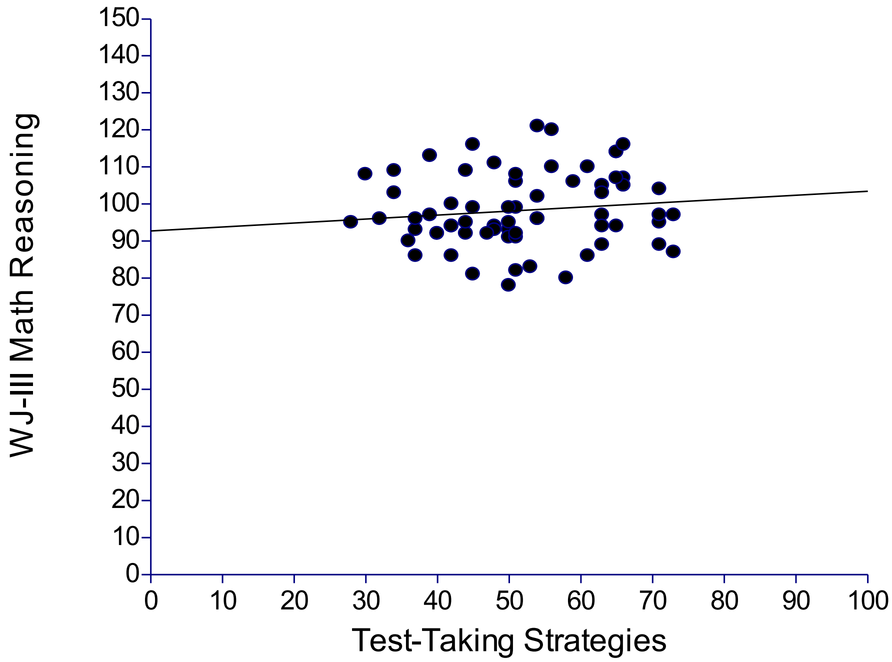

Figure C12e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Reasoning, Fourth Grade

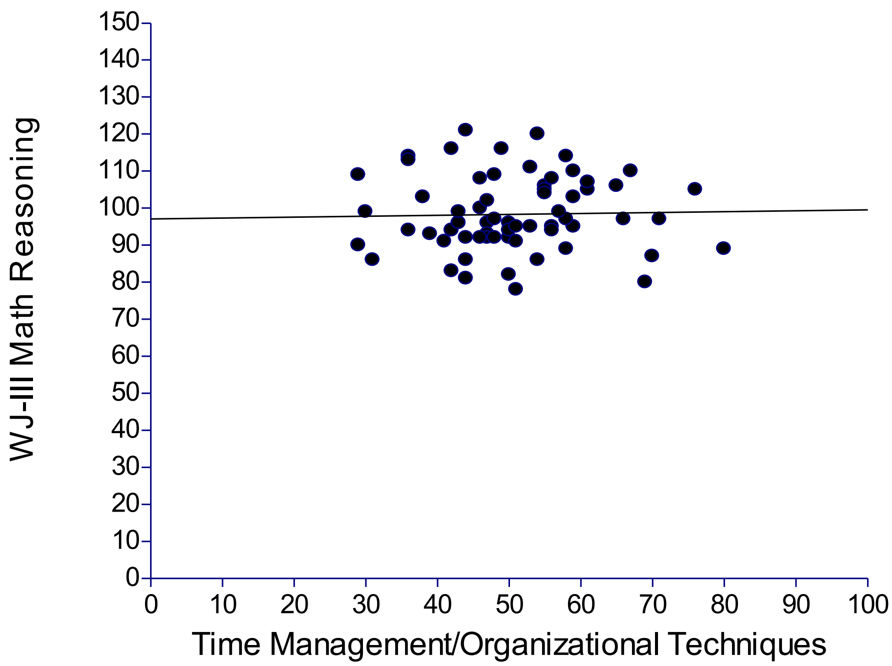

Figure C12f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Reasoning, Fourth Grade

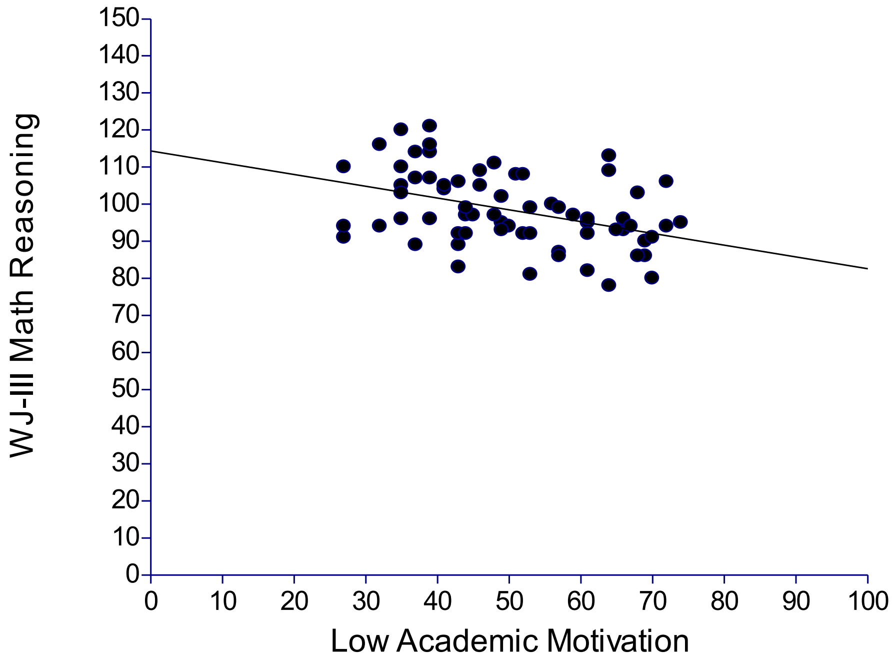

Figure C12g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Reasoning, Fourth Grade

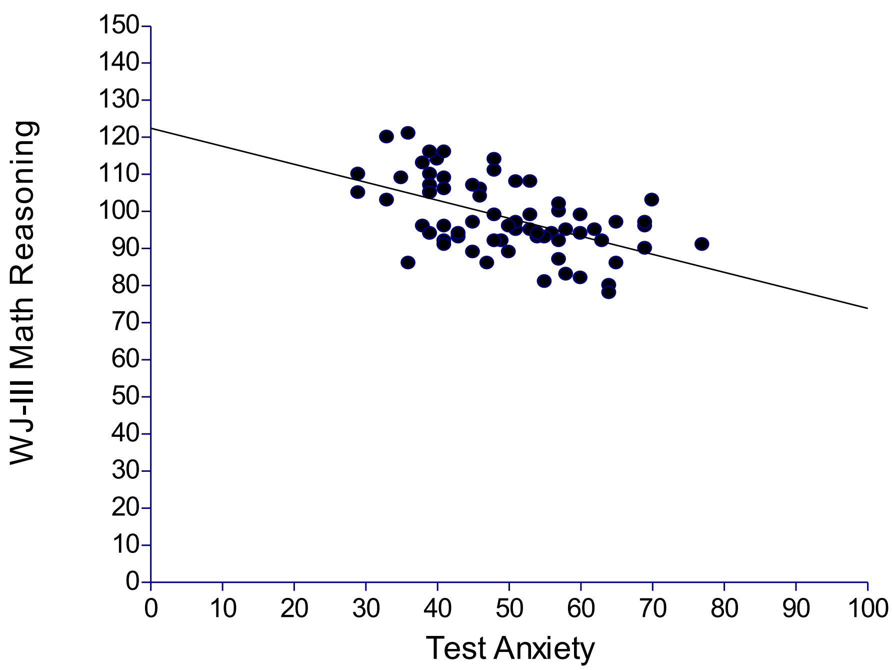

Figure C12h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Reasoning, Fourth Grade

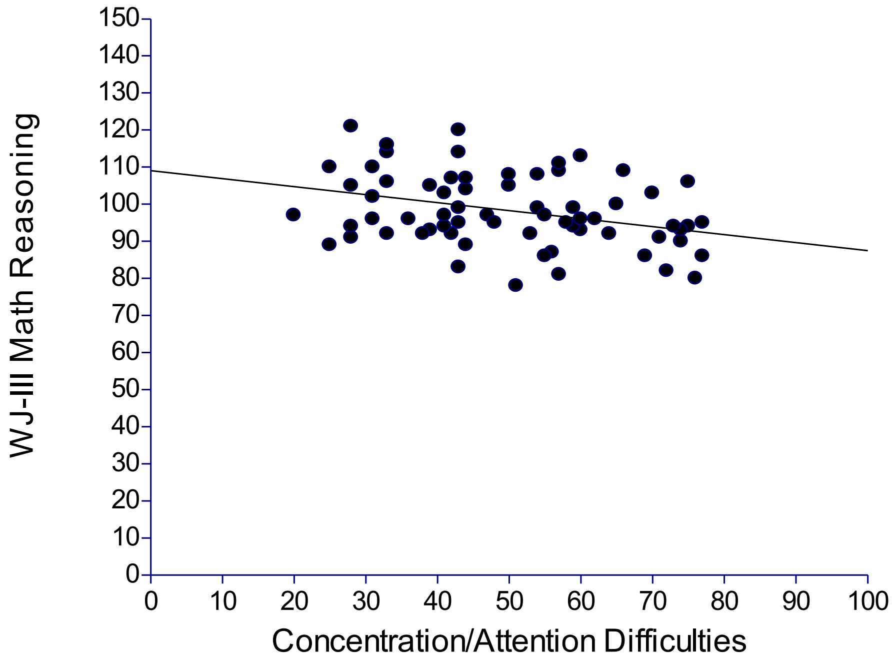

Figure C12i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Reasoning, Fourth Grade

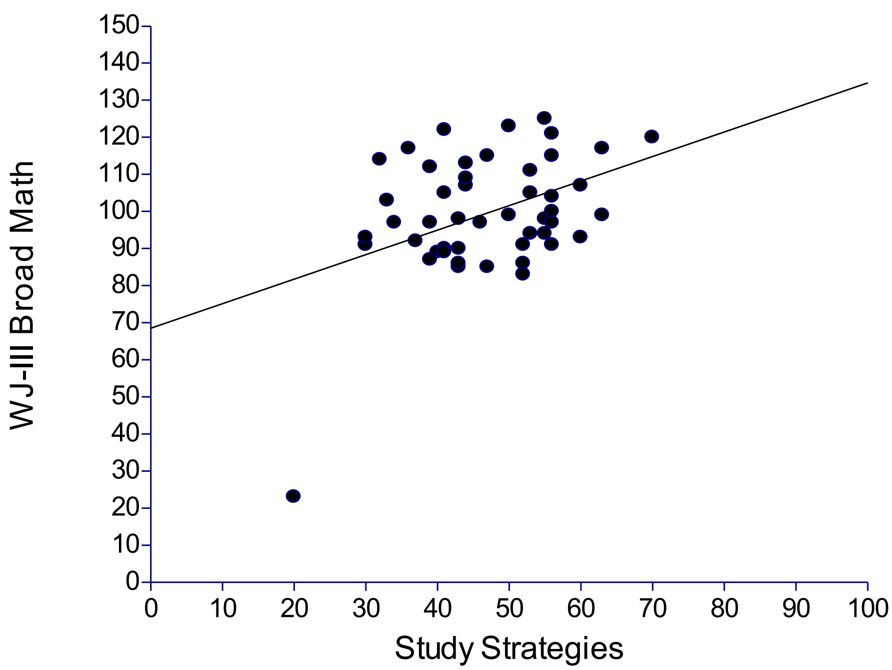

Figure C13a. Scatterplot for SMALSI Study Strategies and WJ-III Broad Math, Fifth Grade

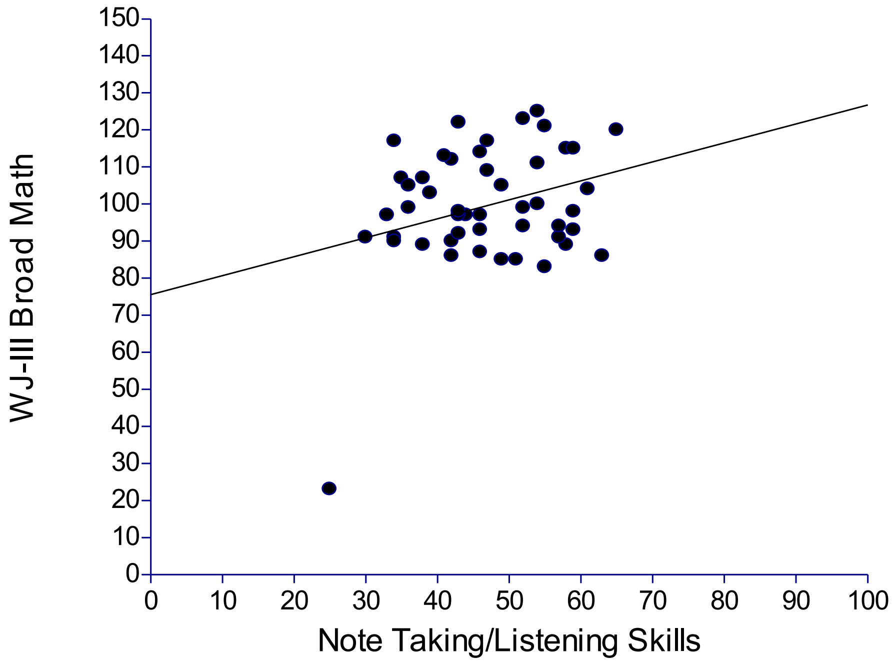

Figure C13b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Broad Math, Fifth Grade

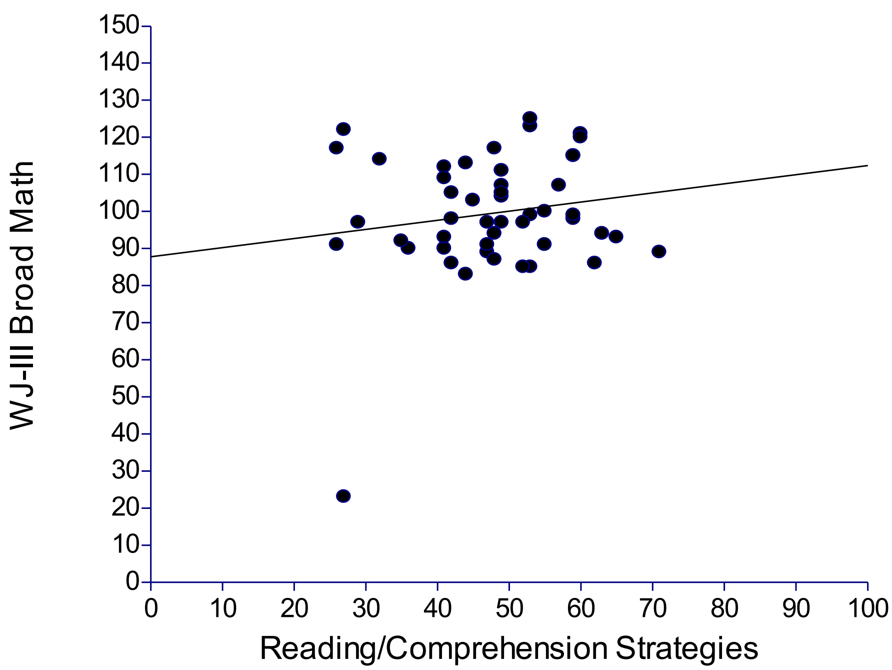

Figure C13c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Broad Math, Fifth Grade

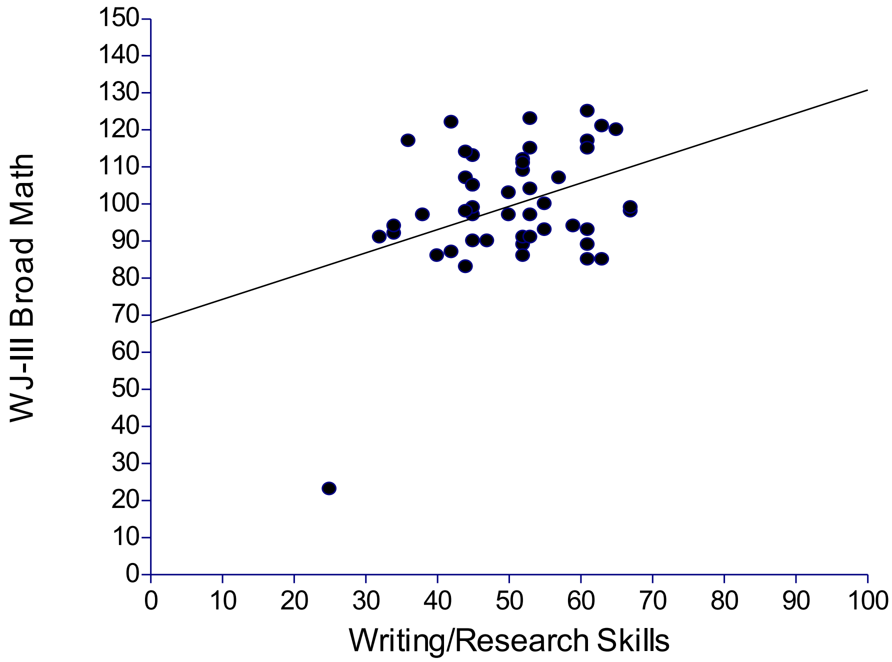

Figure C13d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Broad Math, Fifth Grade

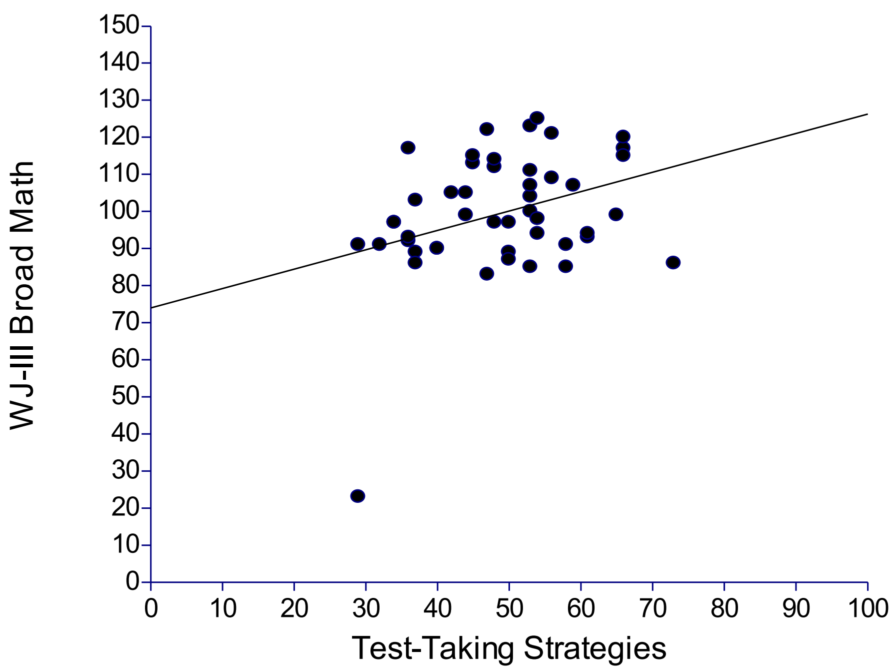

Figure C13e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Broad Math, Fifth Grade

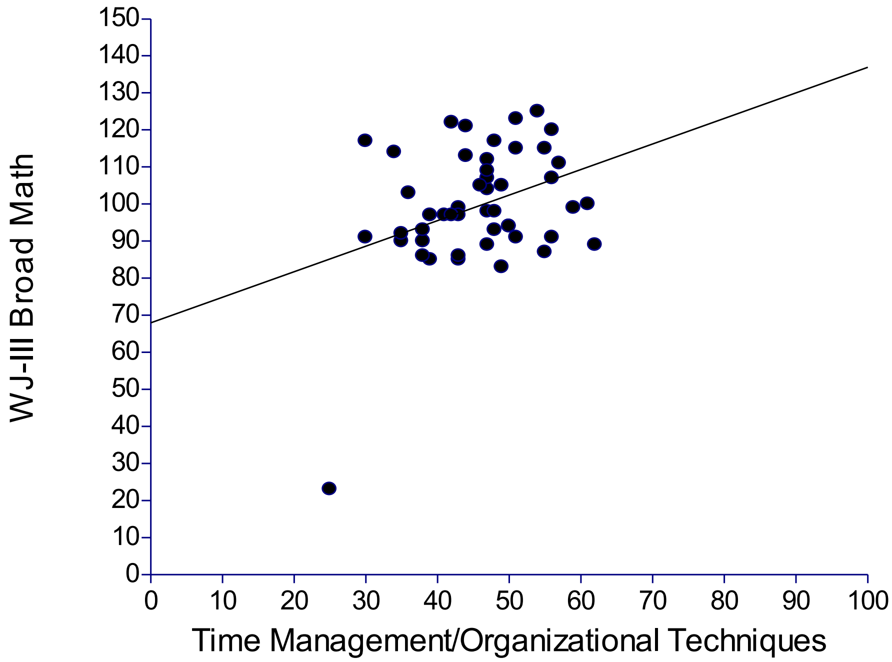

Figure C13f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Broad Math, Fifth Grade

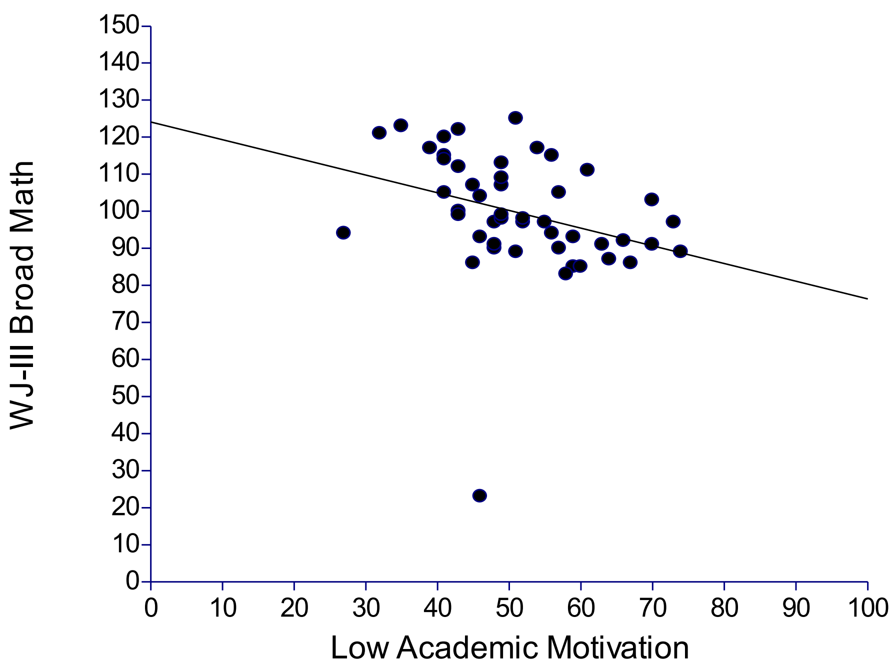

Figure C13g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Broad Math, Fifth Grade

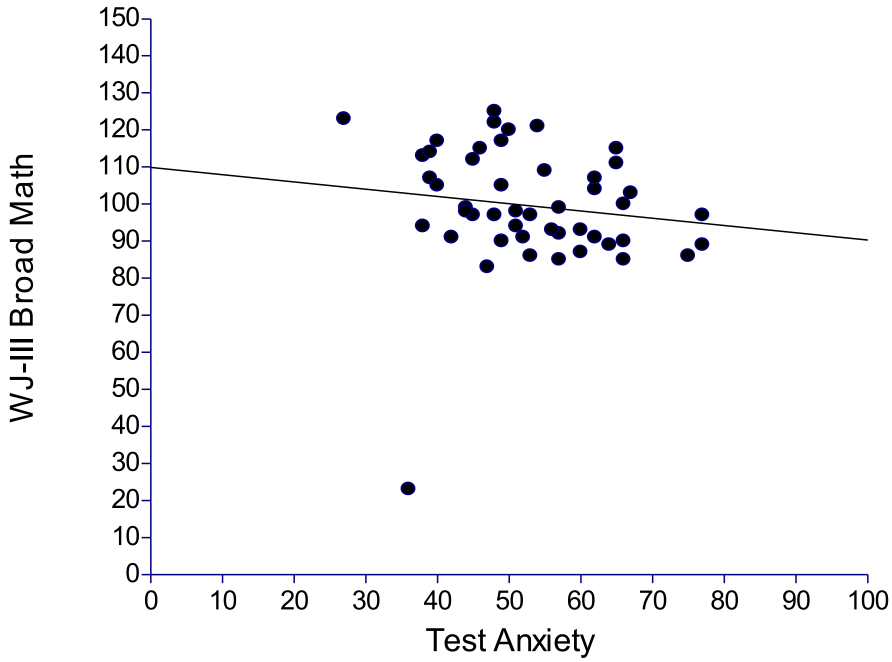

Figure C13h. Scatterplot for SMALSI Test Anxiety and WJ-III Broad Math, Fifth Grade

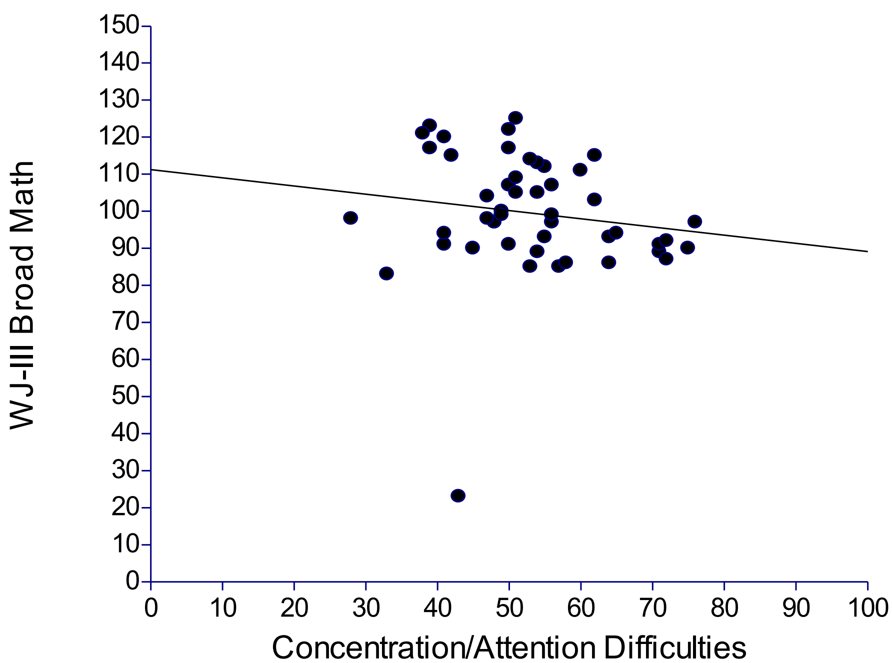

Figure C13i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Broad Math, Fifth Grade

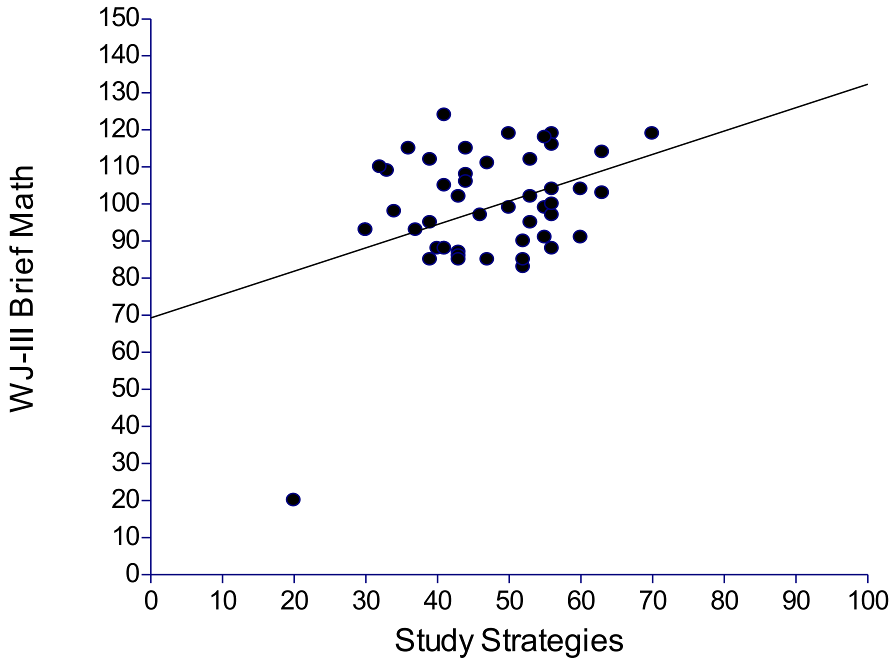

Figure C14a. Scatterplot for SMALSI Study Strategies and WJ-III Brief Math, Fifth Grade

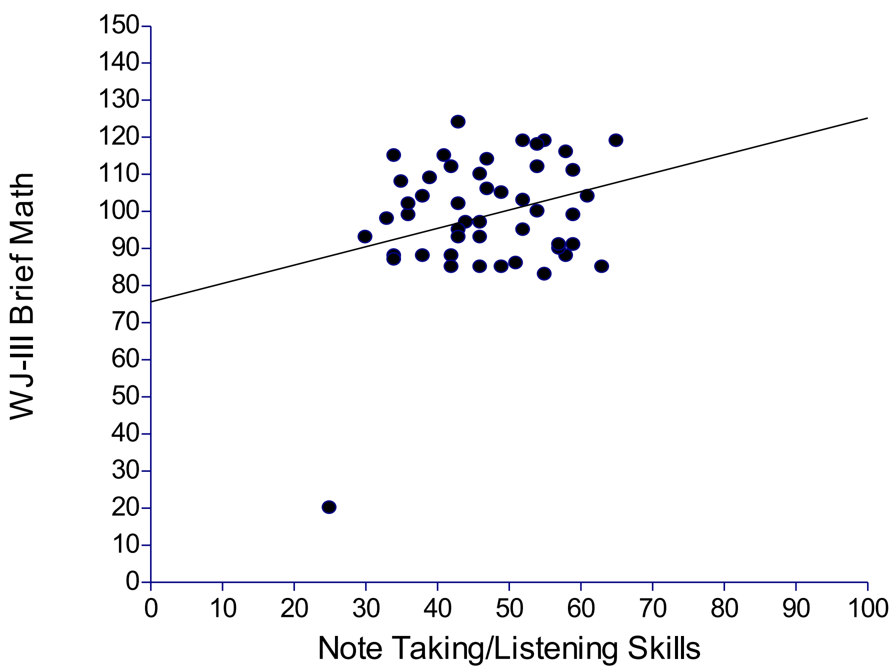

Figure C14b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Brief Math, Fifth Grade

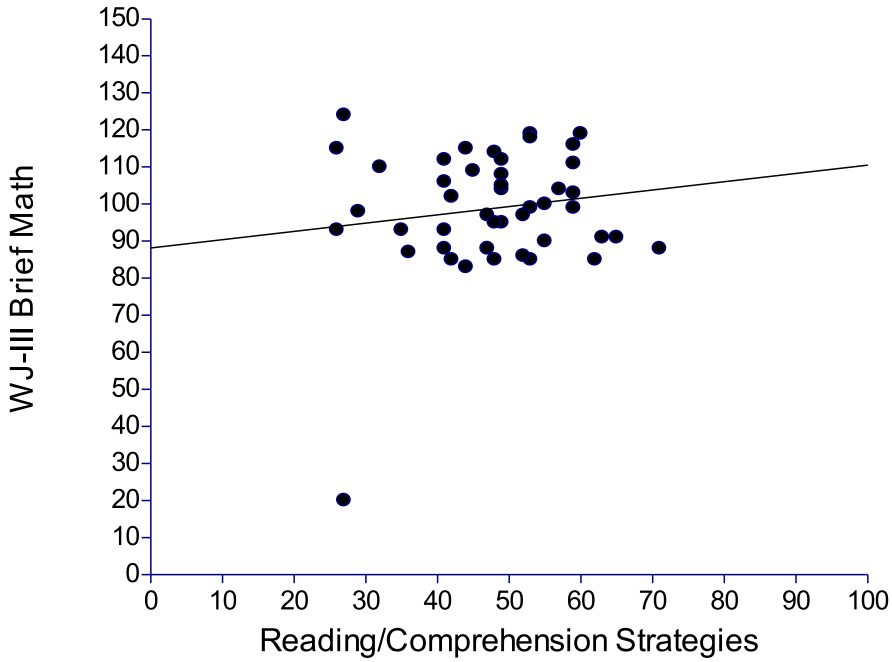

Figure C14c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Brief Math, Fifth Grade

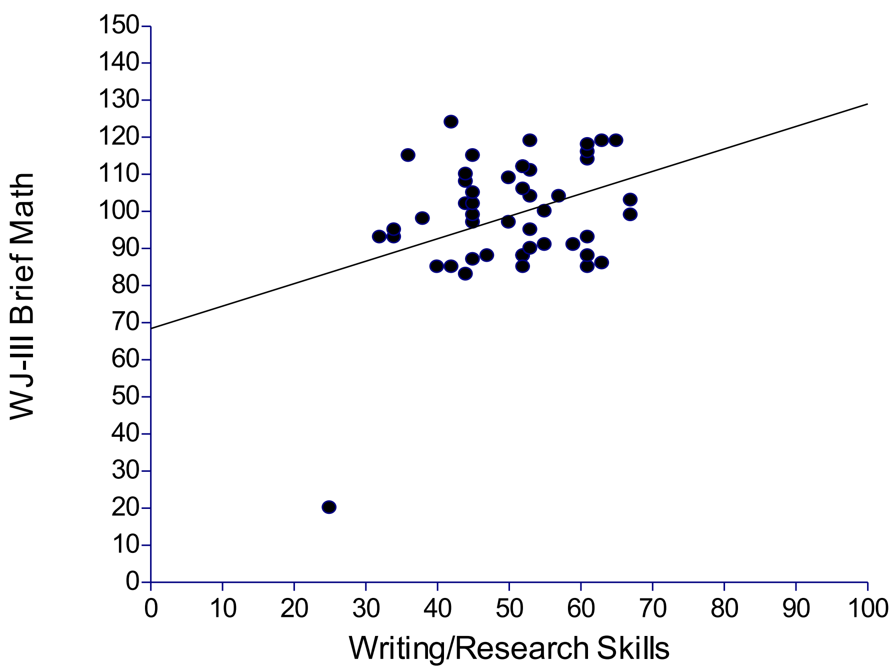

Figure C14d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Brief Math, Fifth Grade

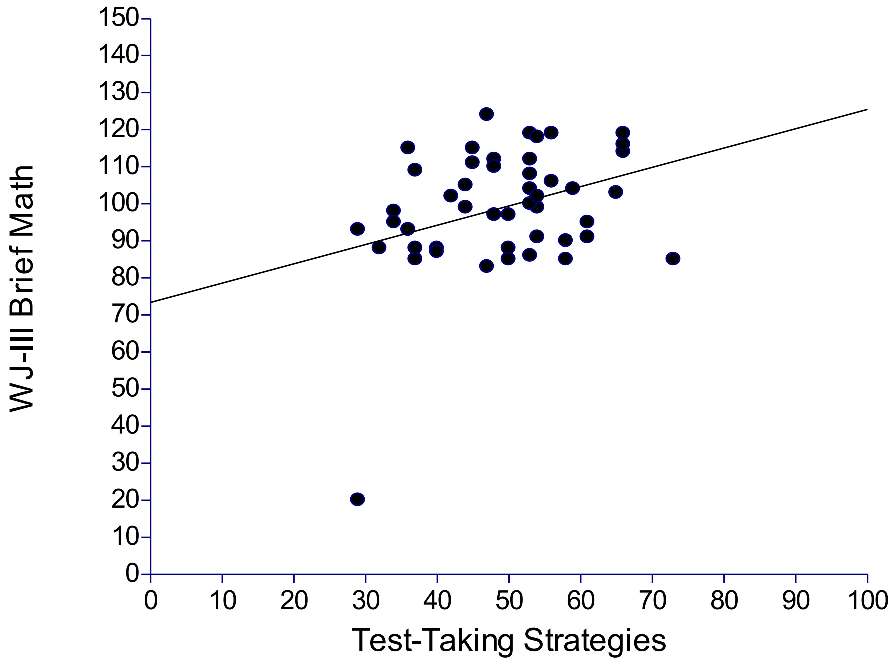

Figure C14e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Brief Math, Fifth Grade

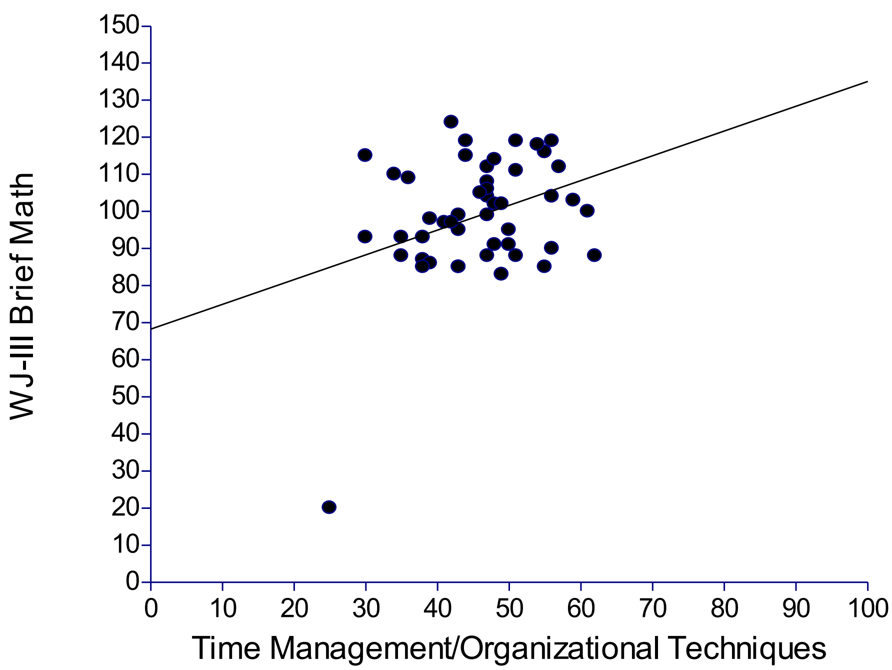

Figure C14f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Brief Math, Fifth Grade

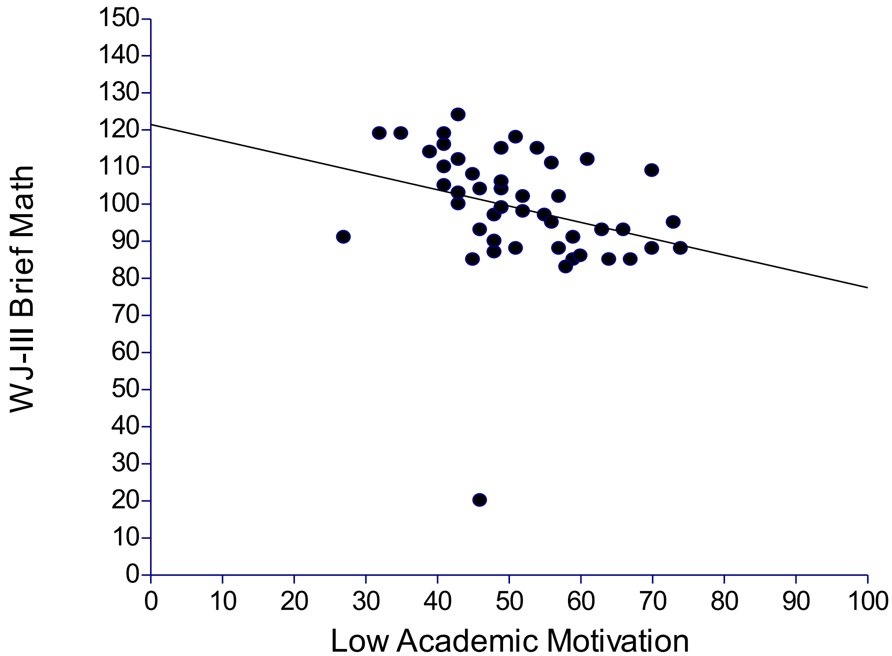

Figure C14g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Brief Math, Fifth Grade

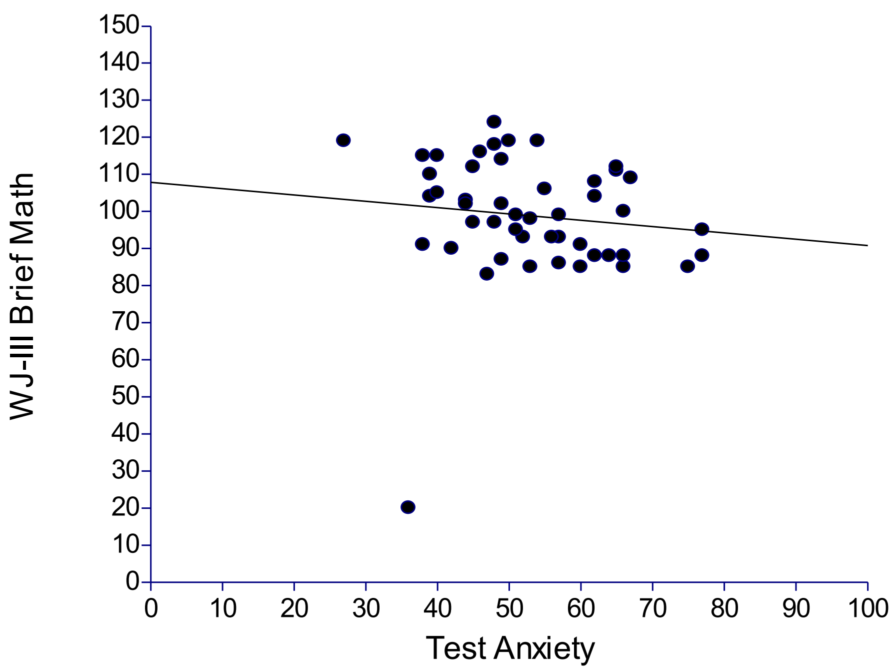

Figure C14h. Scatterplot for SMALSI Test Anxiety and WJ-III Brief Math, Fifth Grade

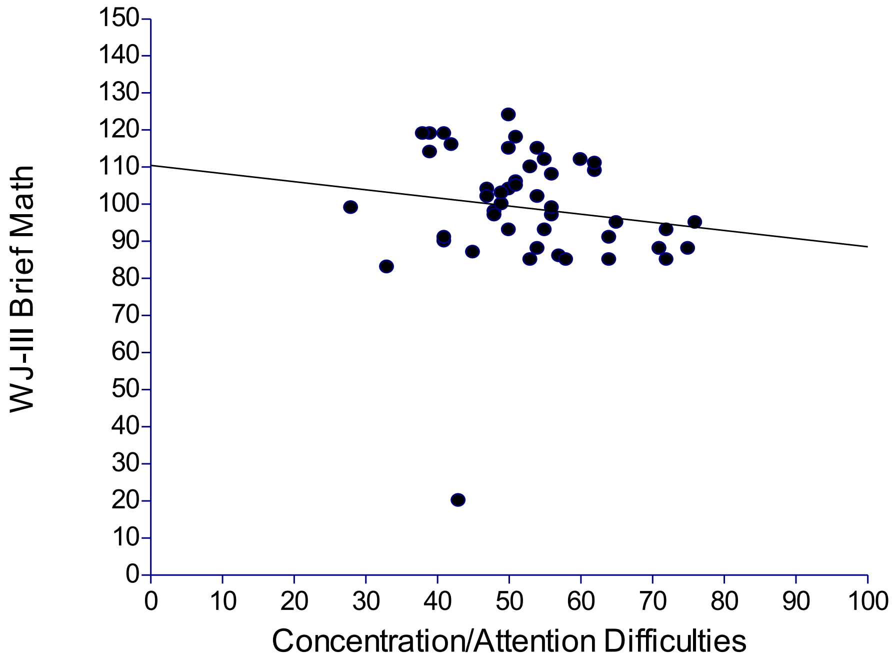

Figure C14i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Brief Math, Fifth Grade

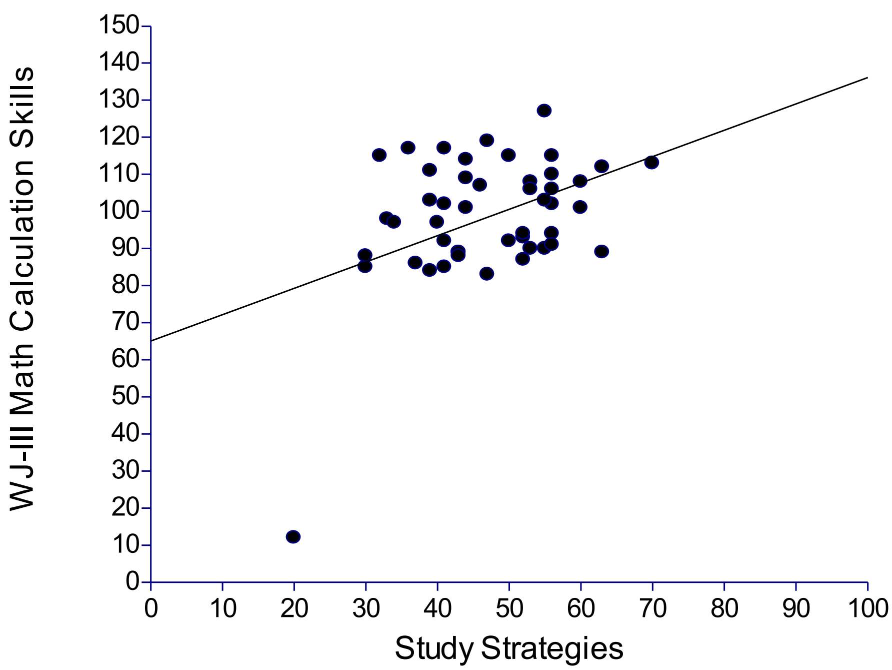

Figure C15a. Scatterplot for SMALSI Study Strategies and WJ-III Math Calculation Skills, Fifth Grade

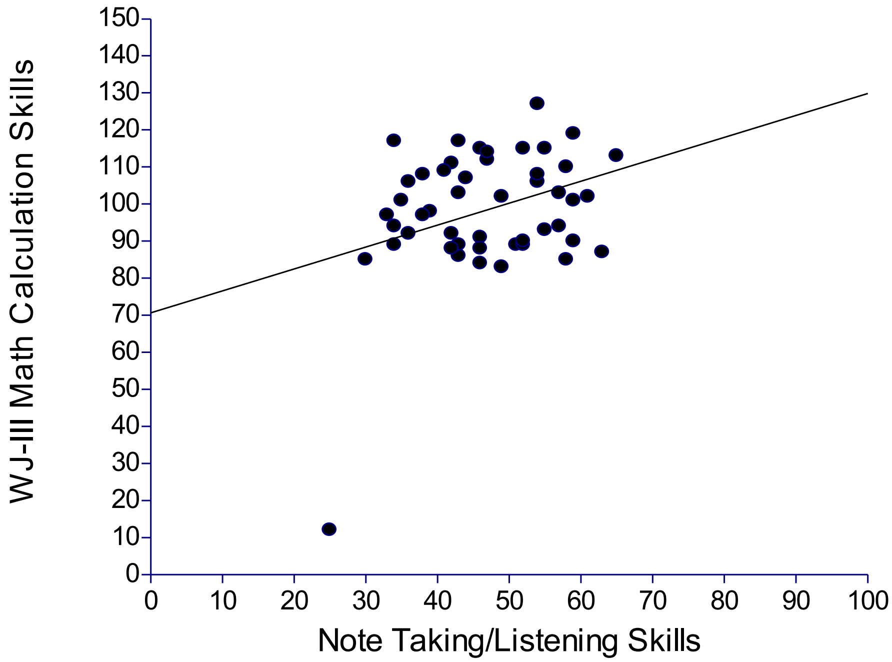

Figure C15b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Calculation Skills, Fifth Grade

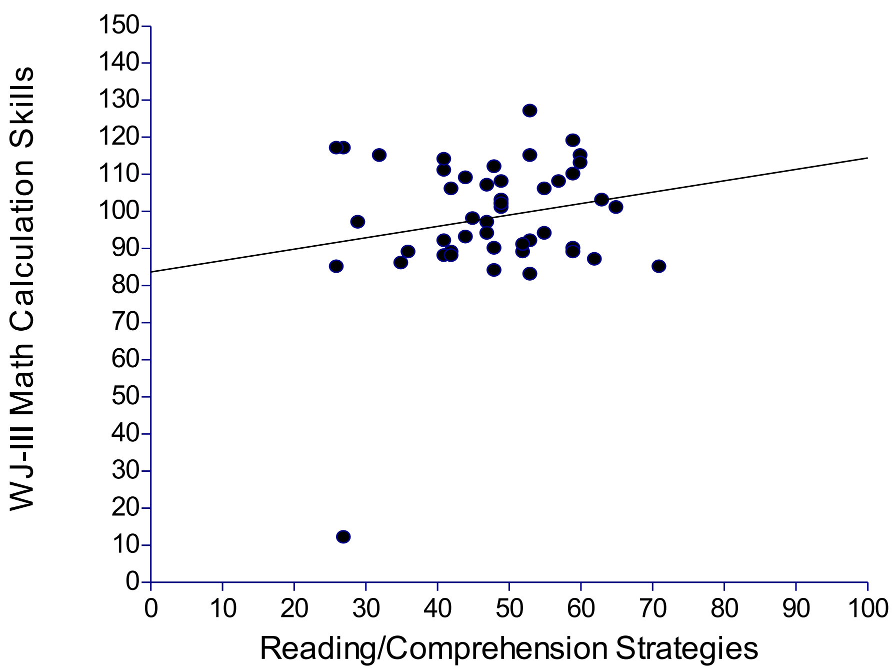

Figure C15c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Calculation Skills, Fifth Grade

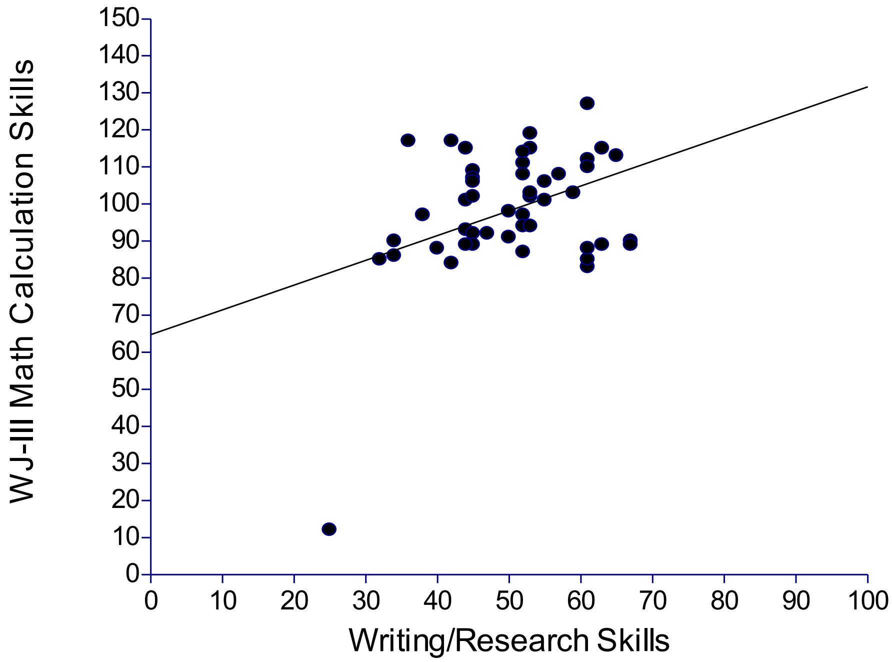

Figure C15d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Calculation Skills, Fifth Grade

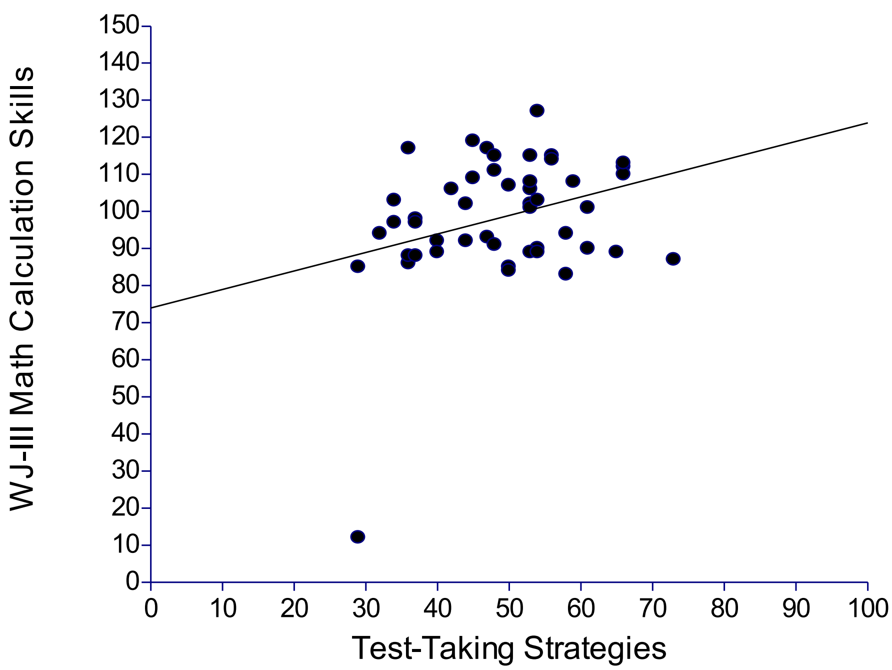

Figure C15e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Calculation Skills, Fifth Grade

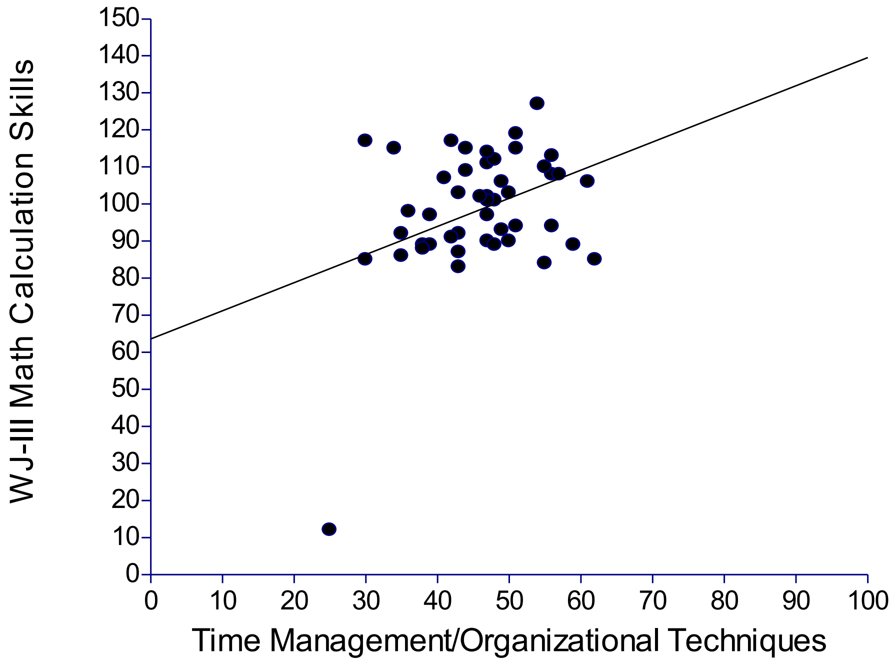

Figure C15f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Calculation Skills, Fifth Grade

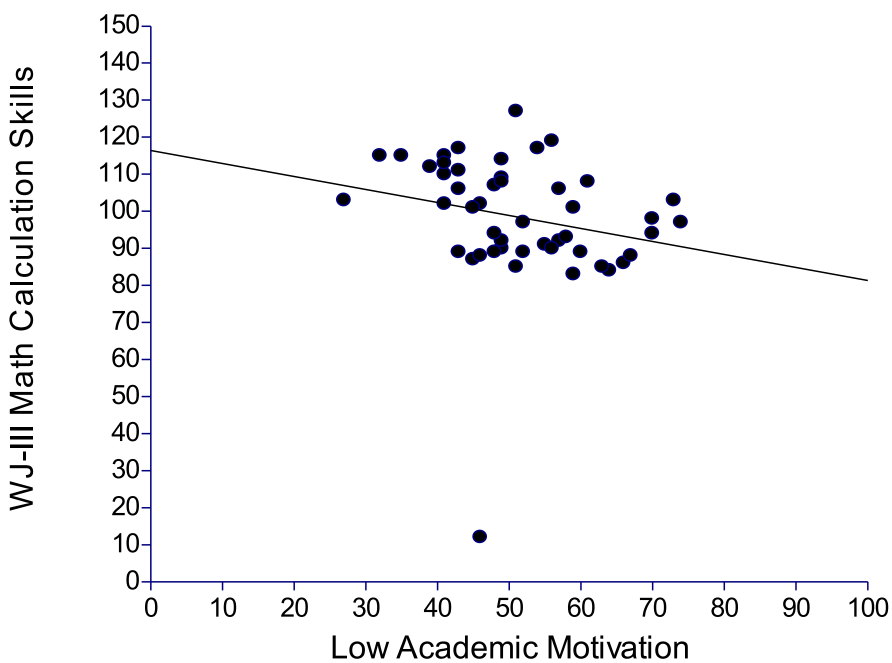

Figure C15g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Calculation Skills, Fifth Grade

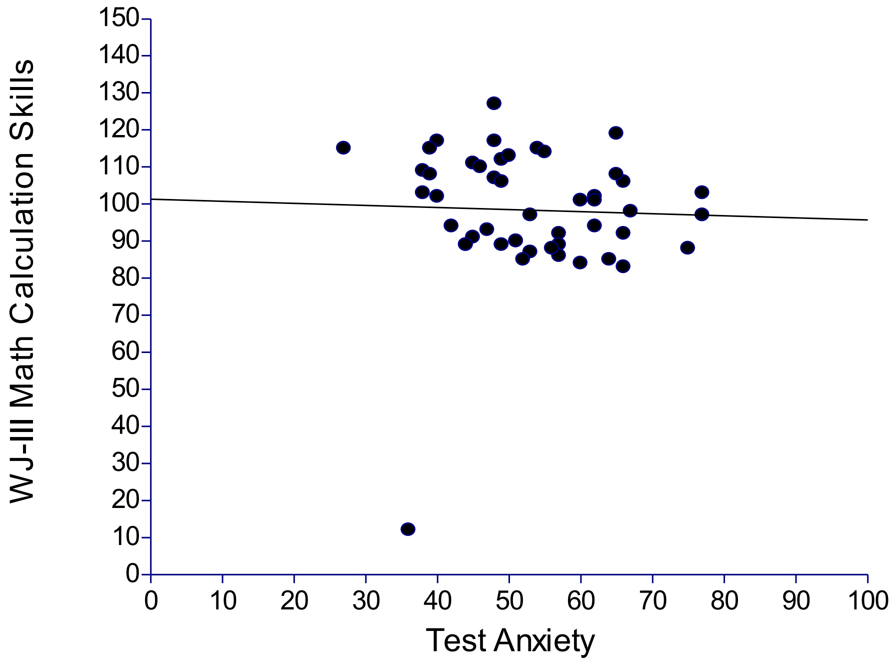

Figure C15h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Calculation Skills, Fifth Grade

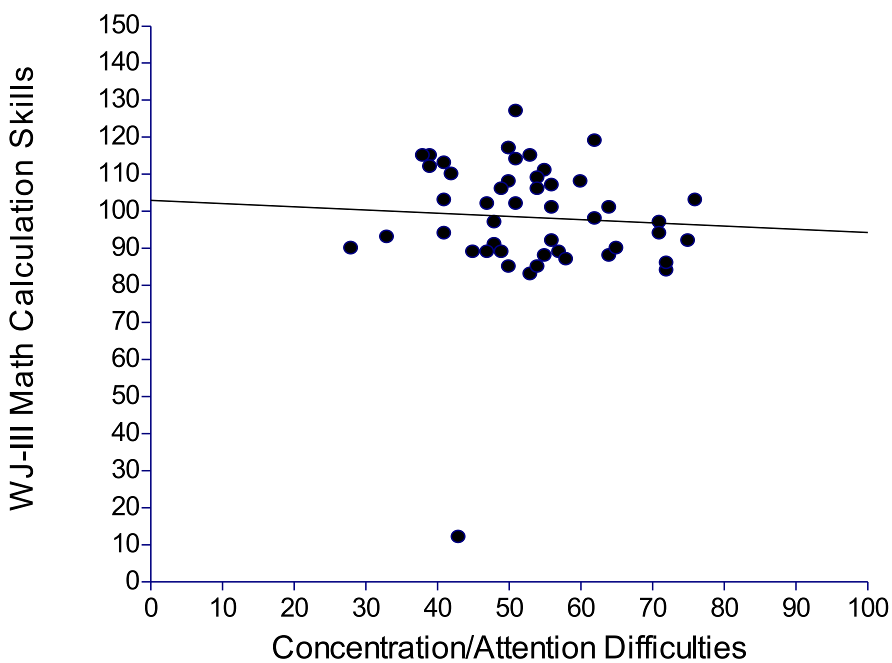

Figure C15i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Calculation Skills, Fifth Grade

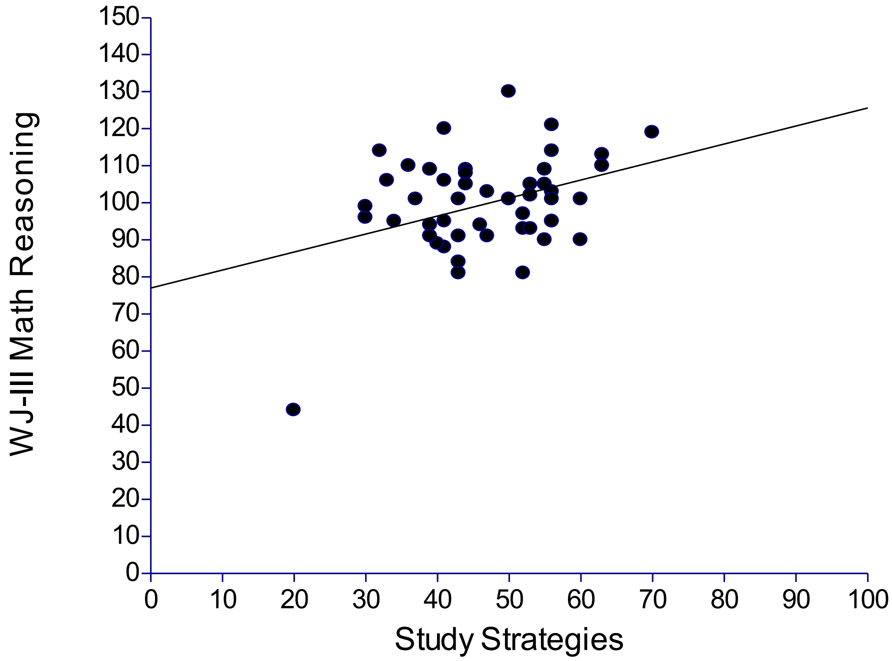

Figure C16a. Scatterplot for SMALSI Study Strategies and WJ-III Math Reasoning, Fifth Grade

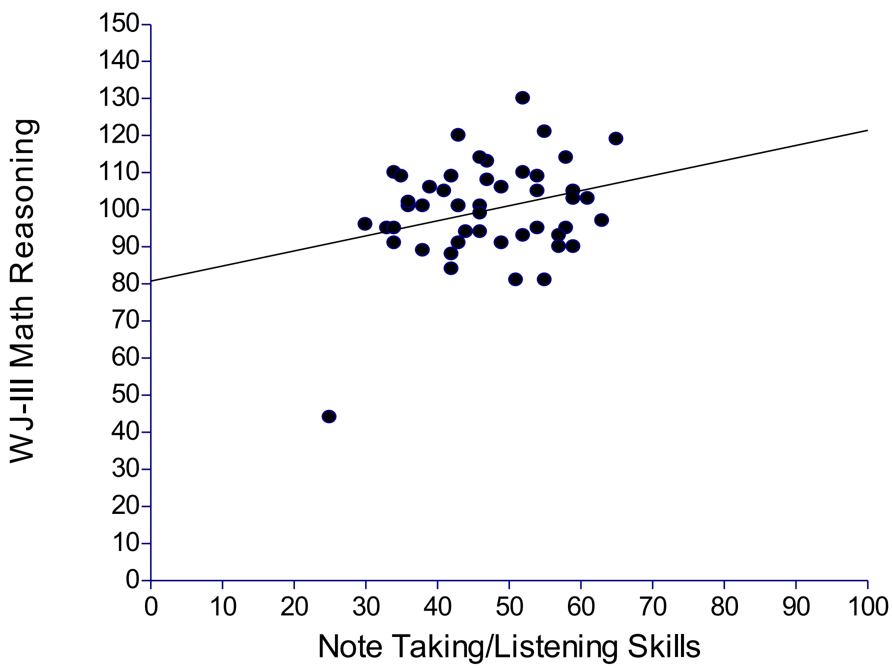

Figure C16b. Scatterplot for SMALSI Note Taking/Listening Skills and WJ-III Math Reasoning, Fifth Grade

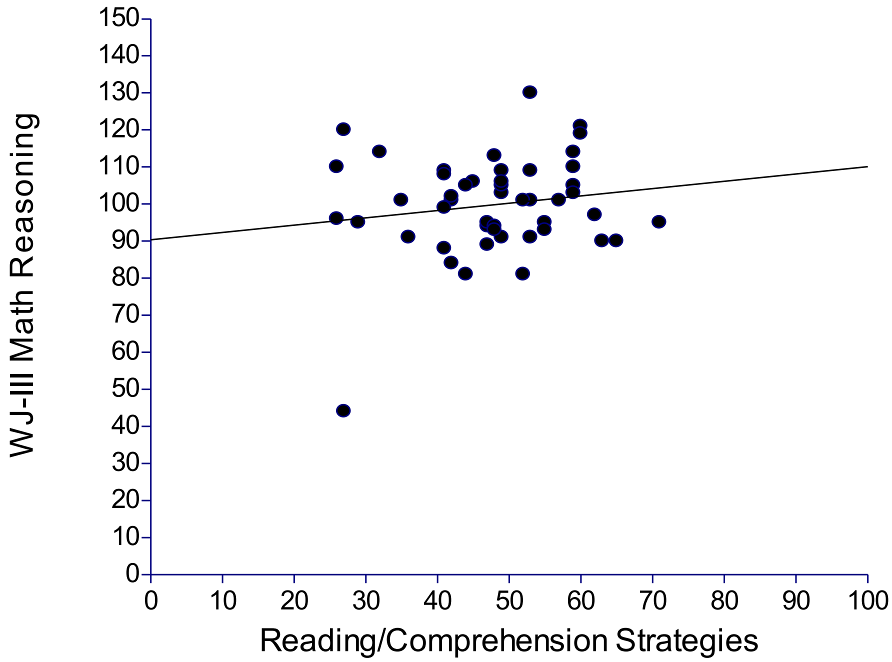

Figure C16c. Scatterplot for SMALSI Reading/Comprehension Strategies and WJ-III Math Reasoning, Fifth Grade

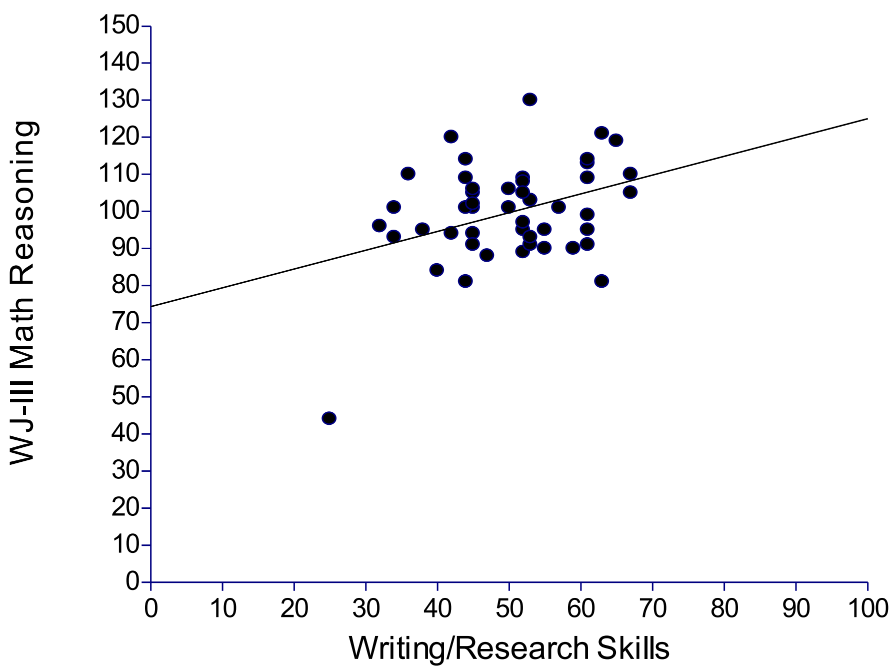

Figure C16d. Scatterplot for SMALSI Writing/Research Skills and WJ-III Math Reasoning, Fifth Grade

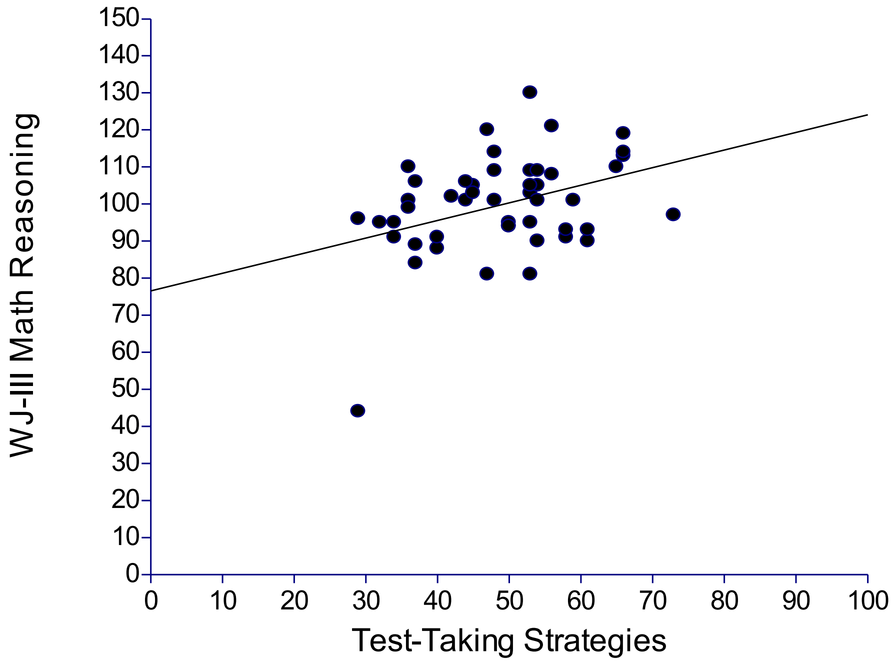

Figure C16e. Scatterplot for SMALSI Test-Taking Strategies and WJ-III Math Reasoning, Fifth Grade

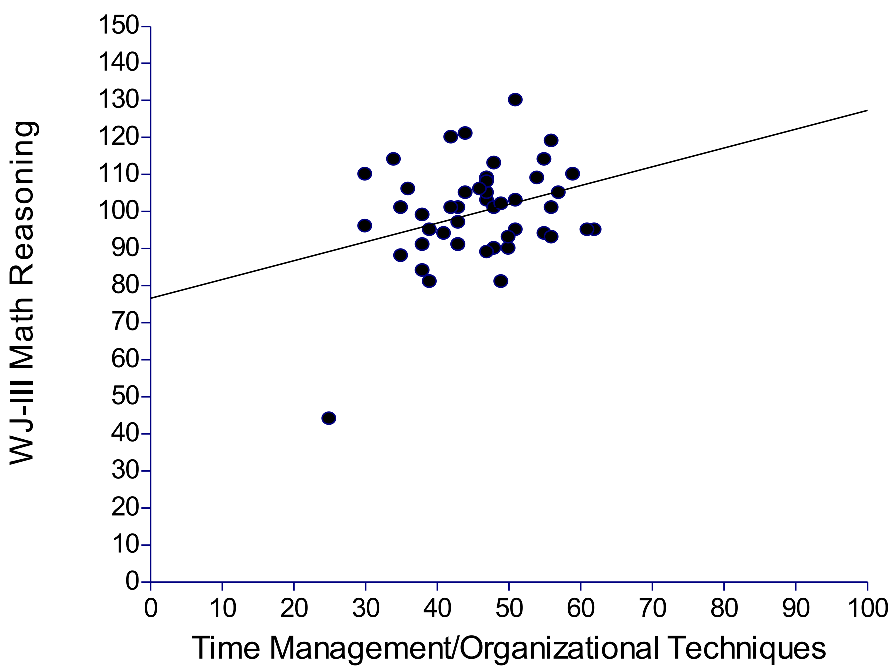

Figure C16f. Scatterplot for SMALSI Time Management/Organizational Techniques and WJ-III Math Reasoning, Fifth Grade

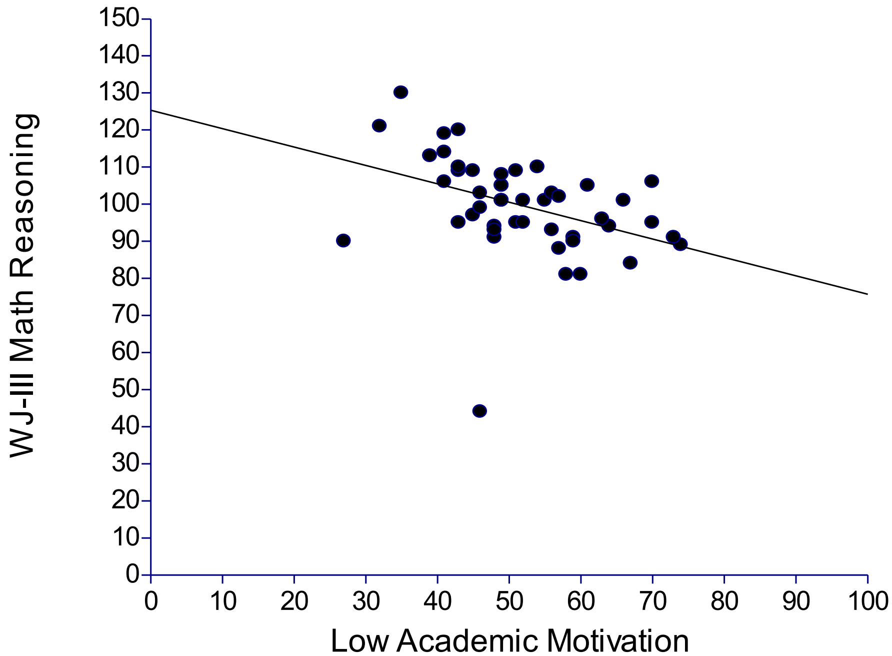

Figure C16g. Scatterplot for SMALSI Low Academic Motivation and WJ-III Math Reasoning, Fifth Grade

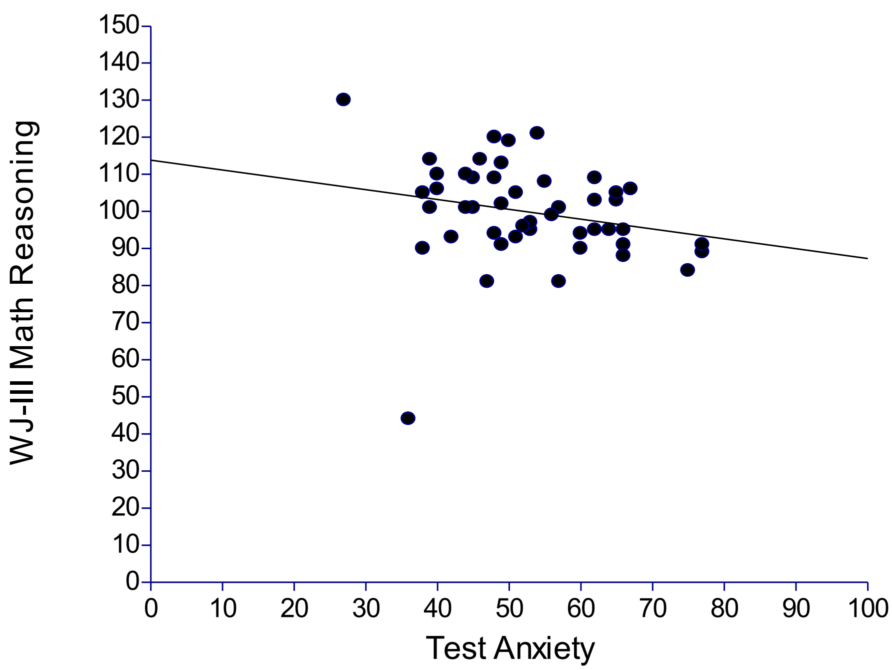

Figure C16h. Scatterplot for SMALSI Test Anxiety and WJ-III Math Reasoning, Fifth Grade

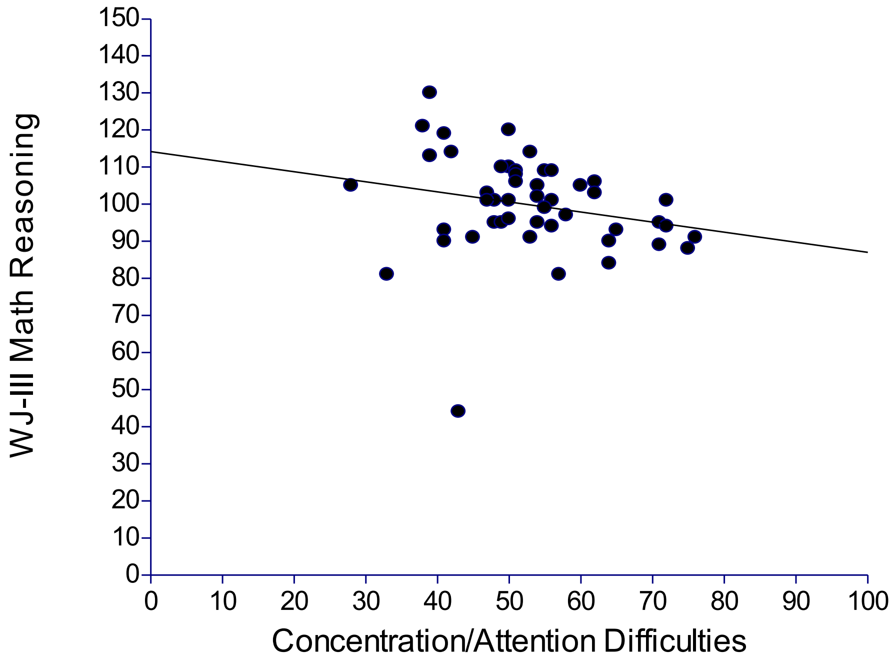

Figure C16i. Scatterplot for SMALSI Concentration/Attention Difficulties and WJ-III Math Reasoning, Fifth Grade

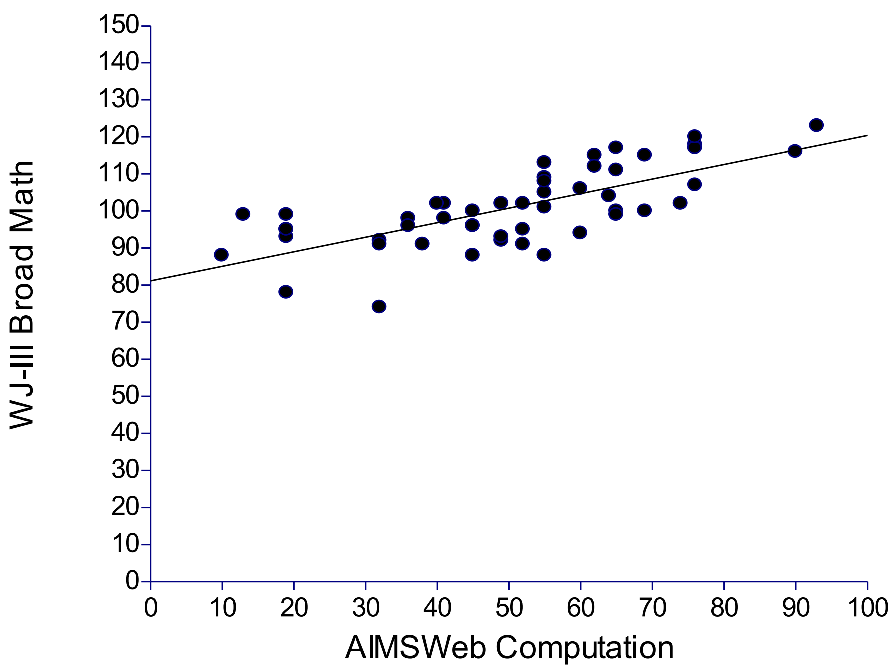

Figure C17a. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Broad Math, Third Grade

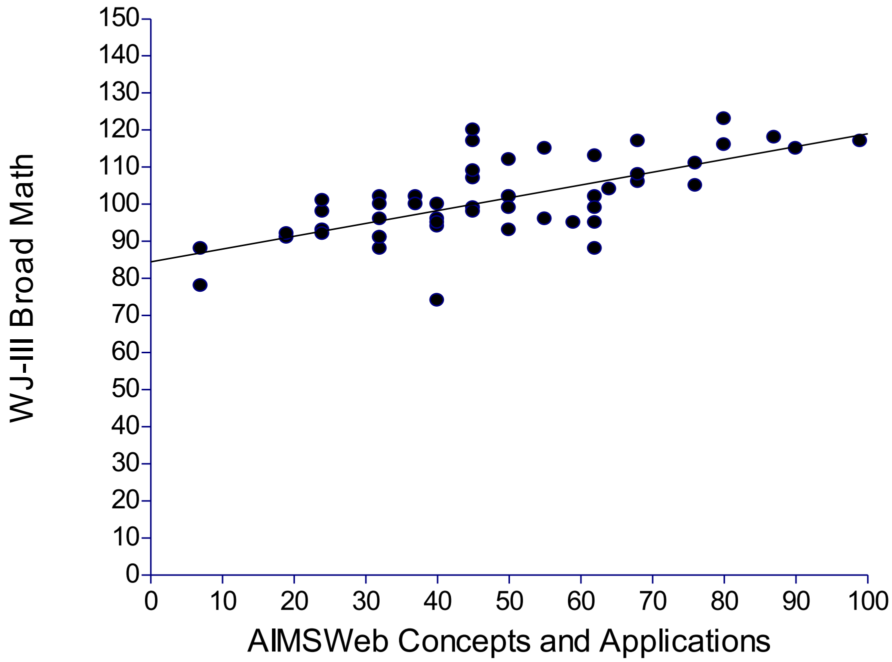

Figure C17b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Broad Math, Third Grade

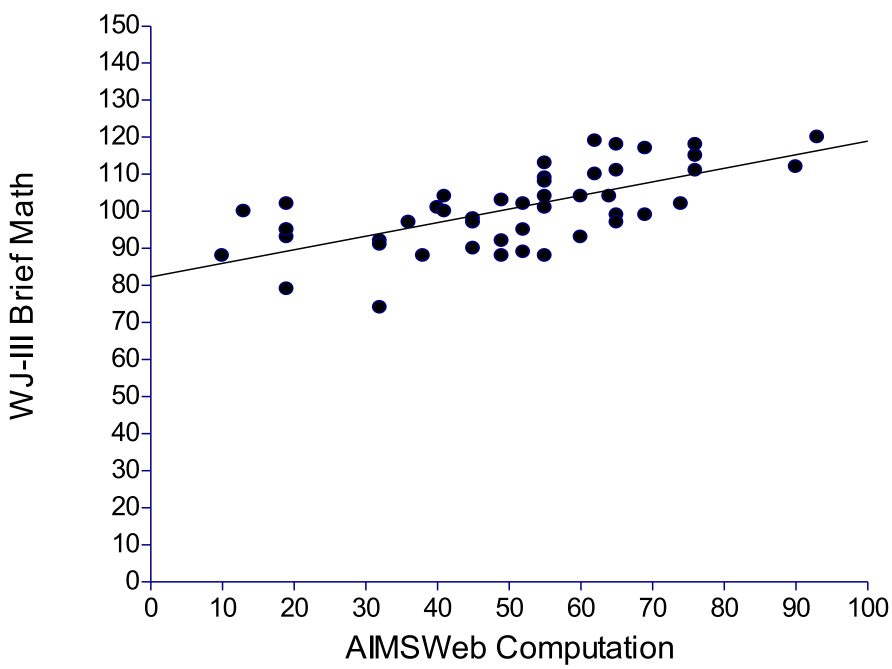

Figure C17c. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Brief Math, Third Grade

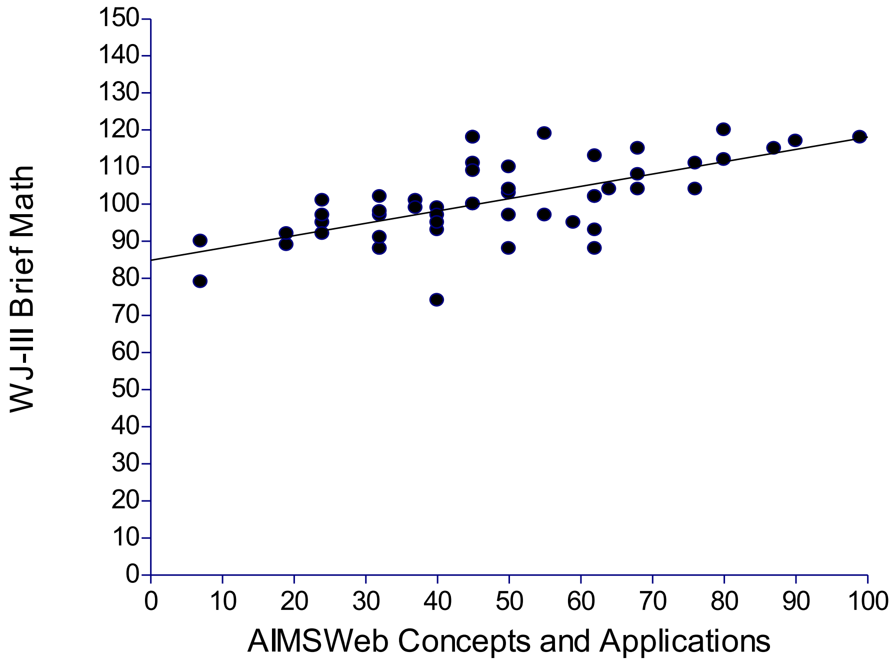

Figure C17d. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Brief Math, Third Grade

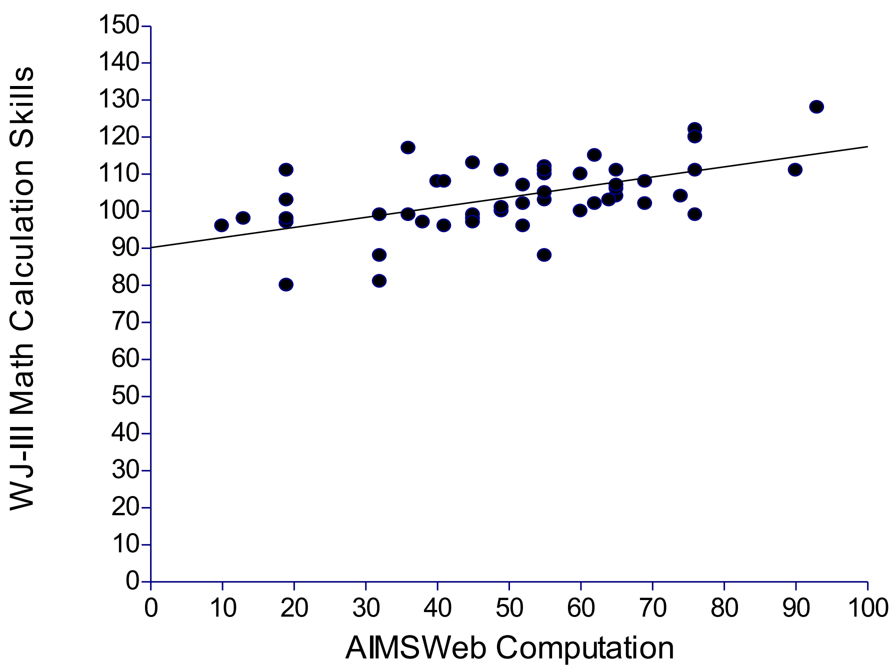

Figure C17e. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Calculation Skills, Third Grade

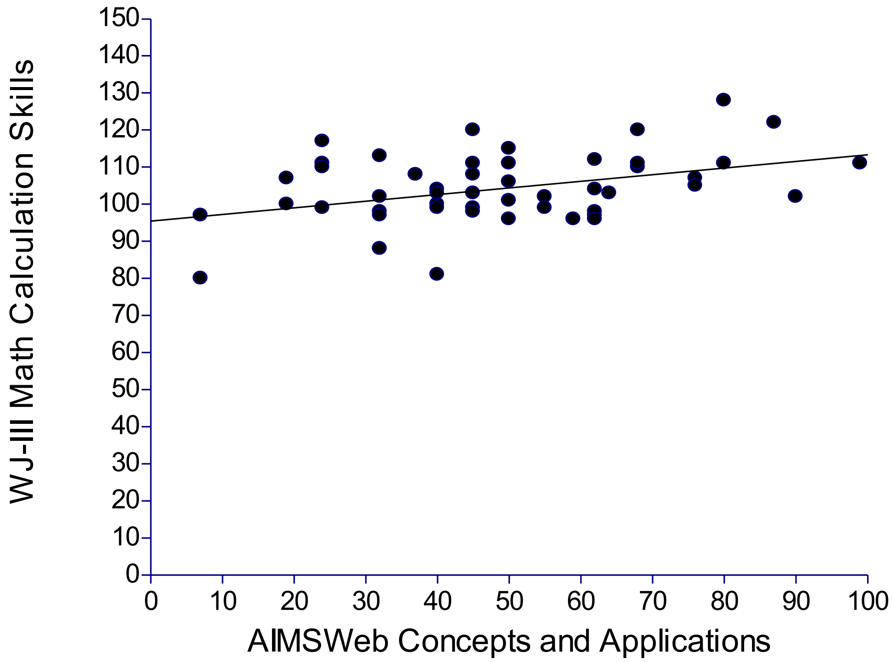

Figure C17f. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Calculation Skills, Third Grade

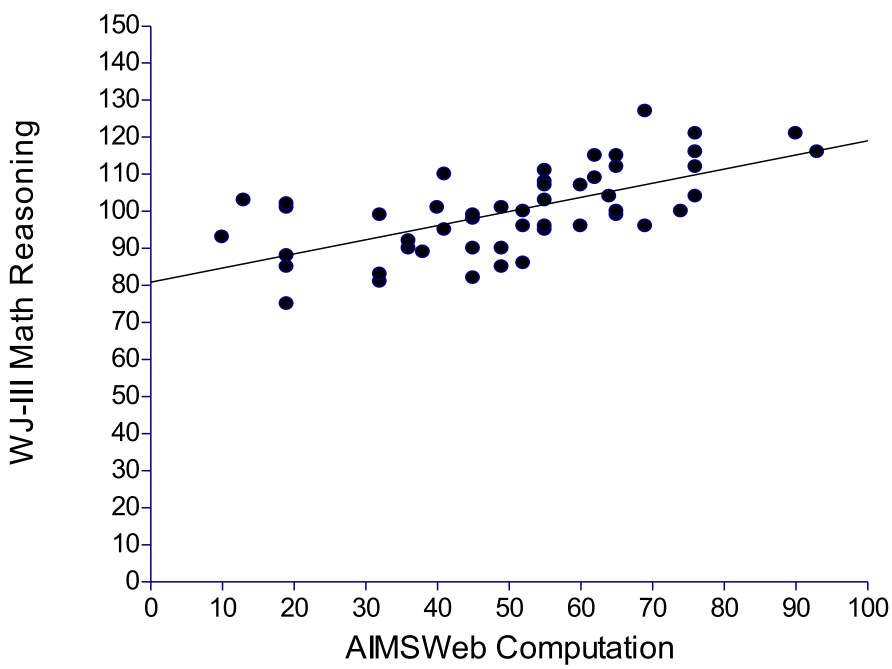

Figure C17g. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Reasoning, Third Grade

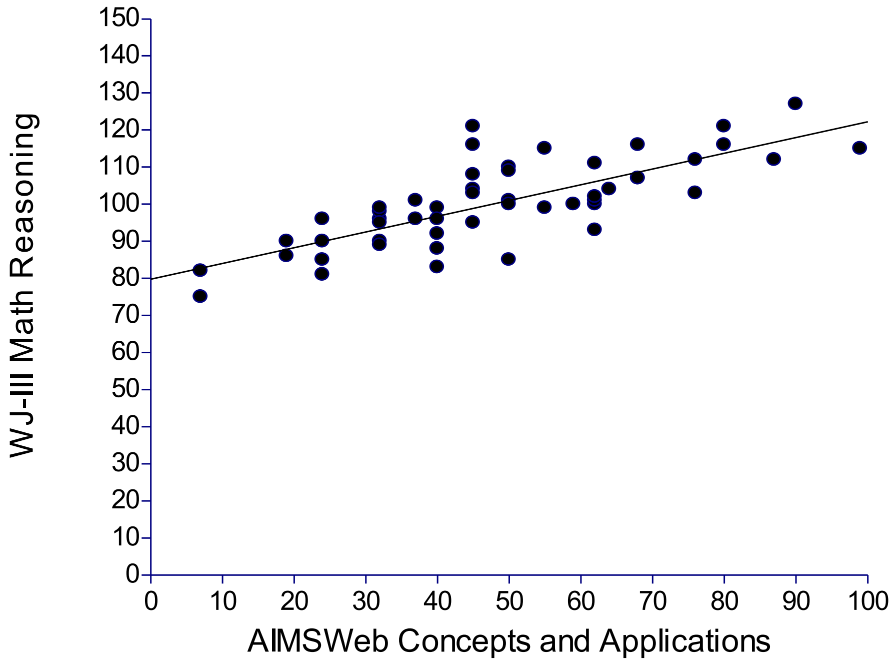

Figure C17h. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Reasoning, Third Grade

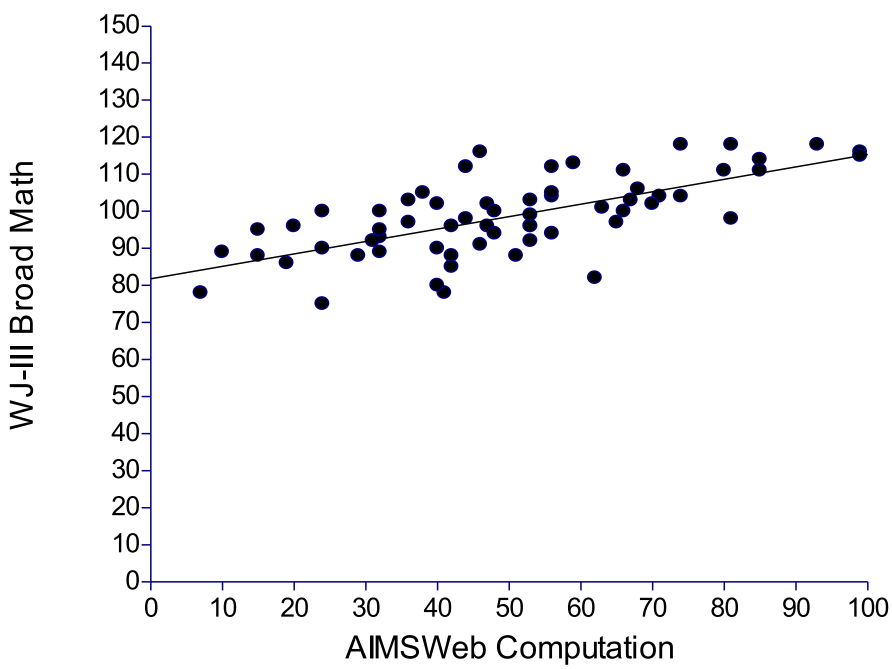

Figure C18a. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Broad Math, Fourth Grade

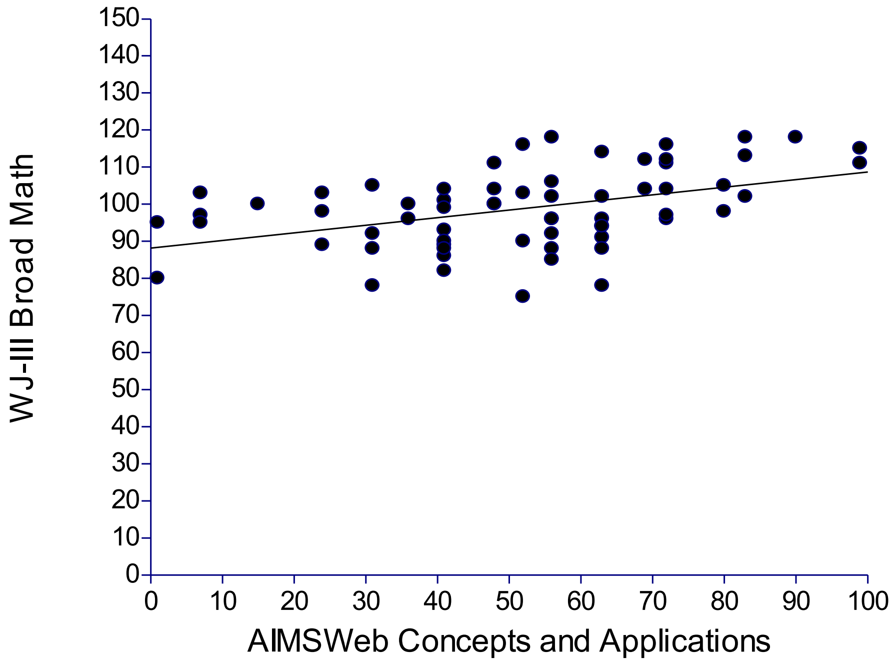

Figure C18b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Broad Math, Fourth Grade

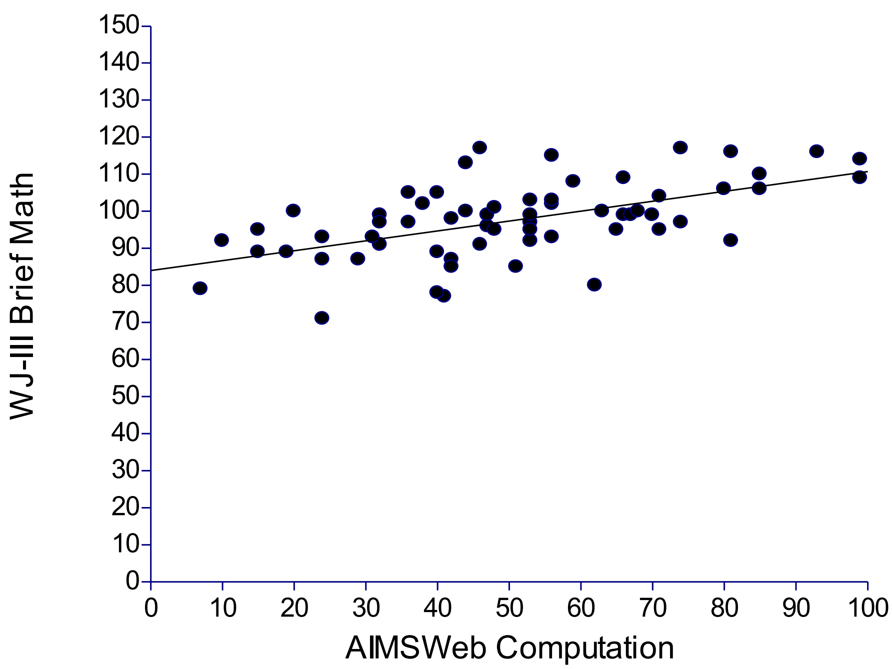

Figure C18c. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Brief Math, Fourth Grade

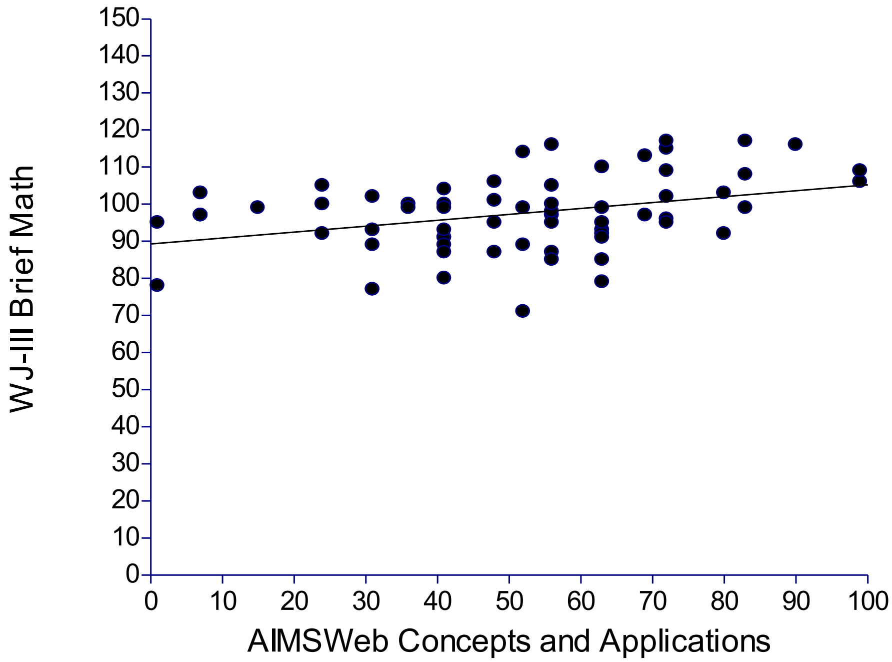

Figure C18d. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Brief Math, Fourth Grade

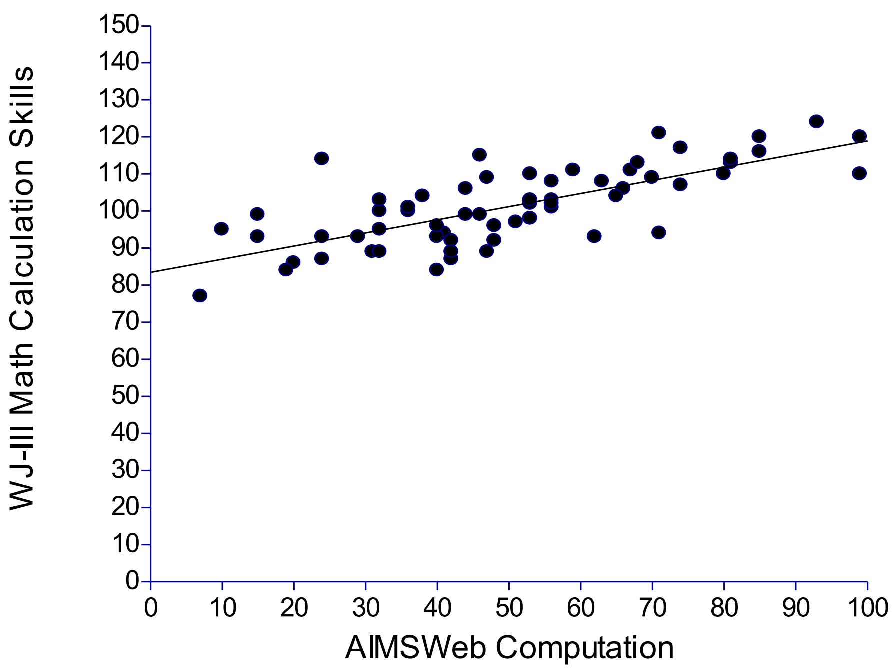

Figure C18e. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Calculation Skills, Fourth Grade

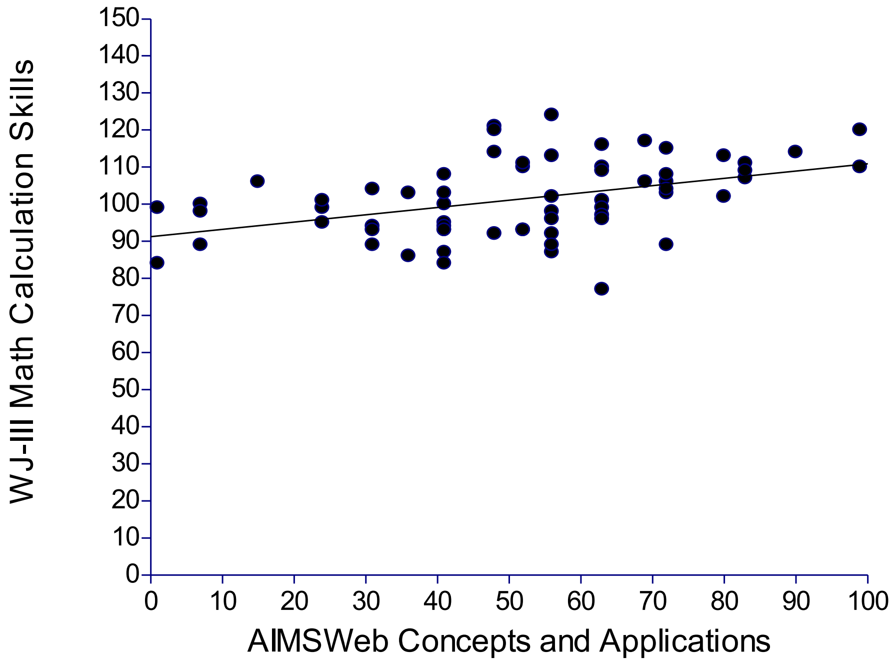

Figure C18f. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Caulcation Skills, Fourth Grade

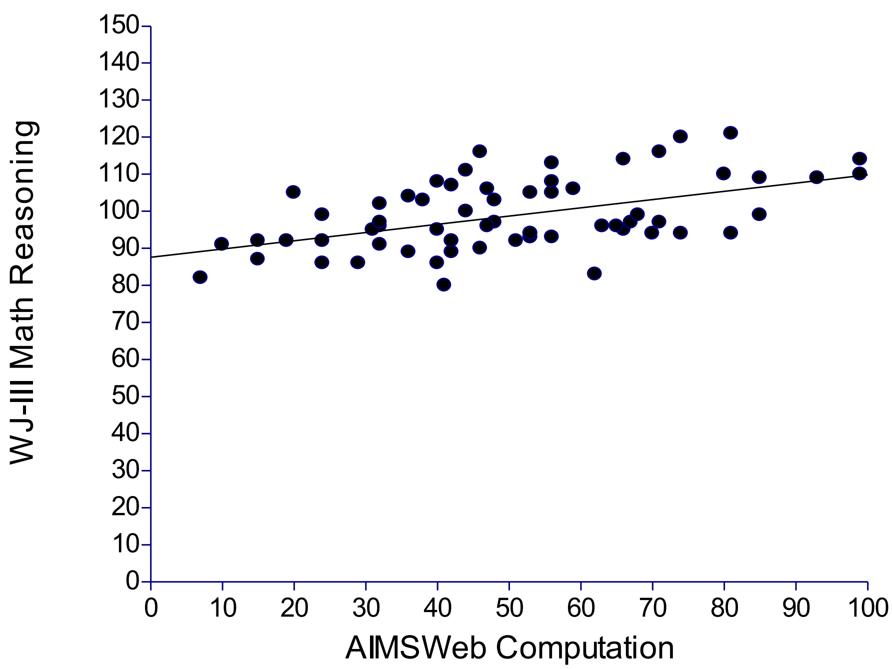

Figure C18g. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Reasoning, Fourth Grade

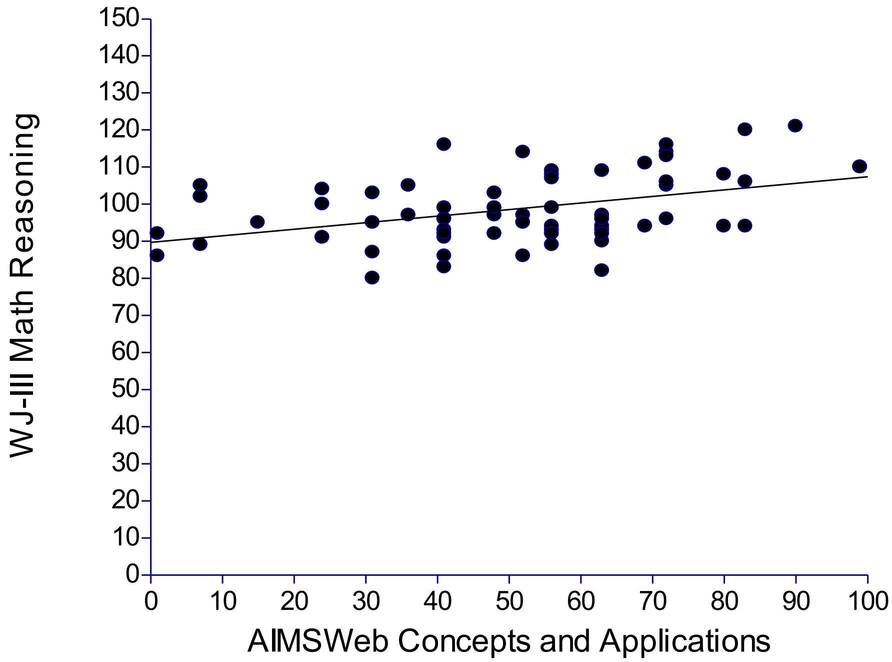

Figure C18h. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Reasoning, Fourth Grade

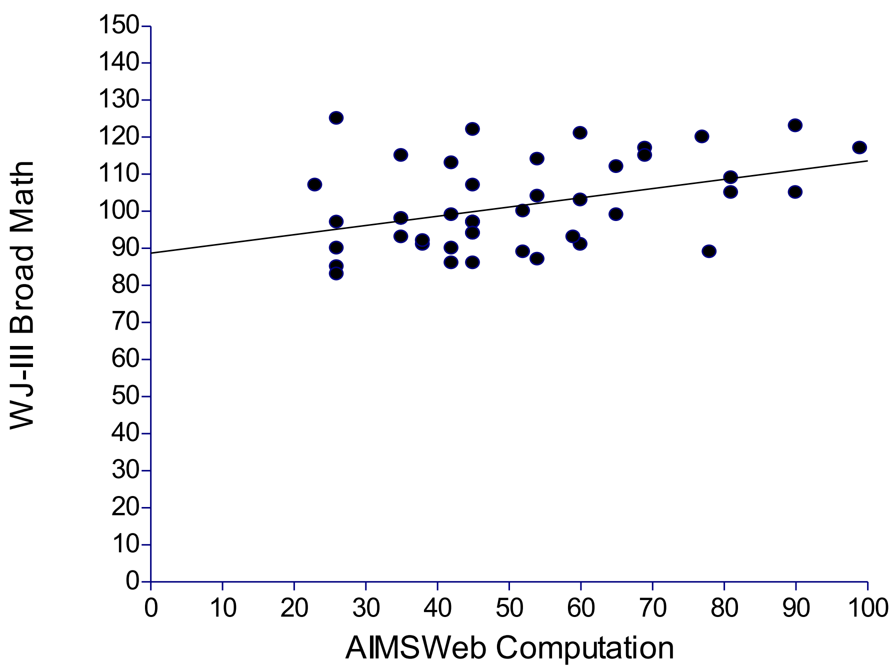

Figure C19a. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Broad Math, Fifth Grade

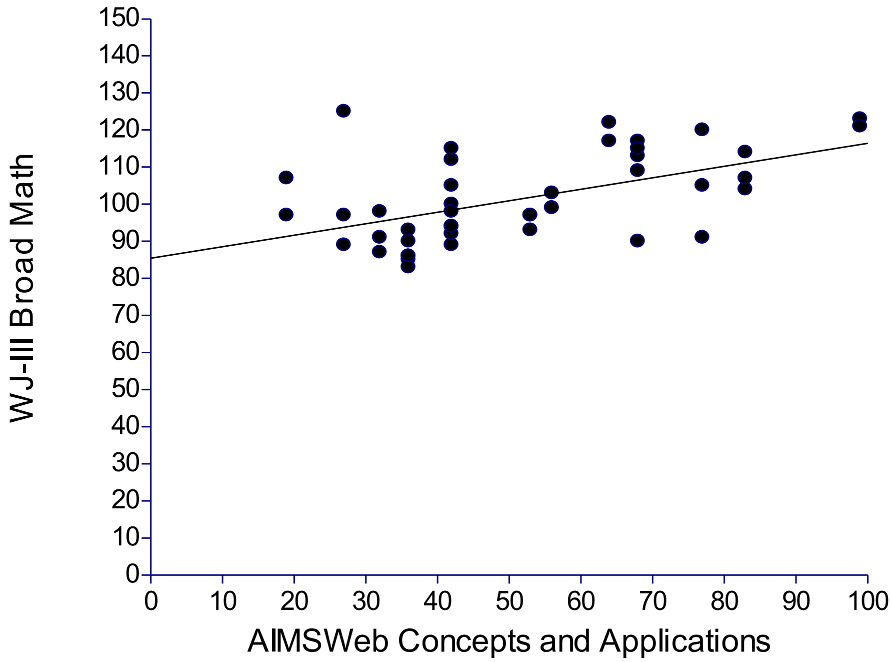

Figure C19b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Broad Math, Fifth Grade

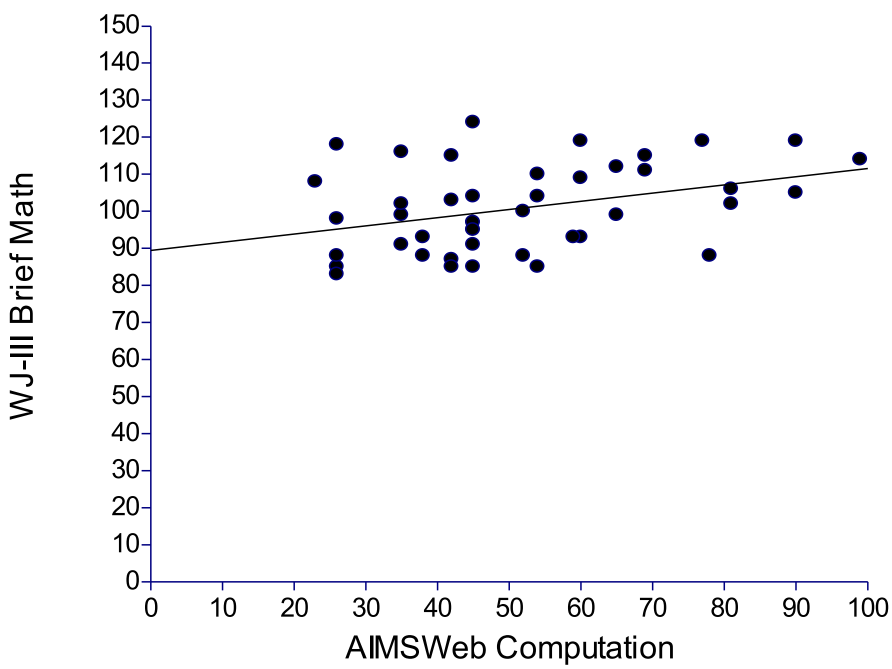

Figure C19c. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Brief Math, Fifth Grade

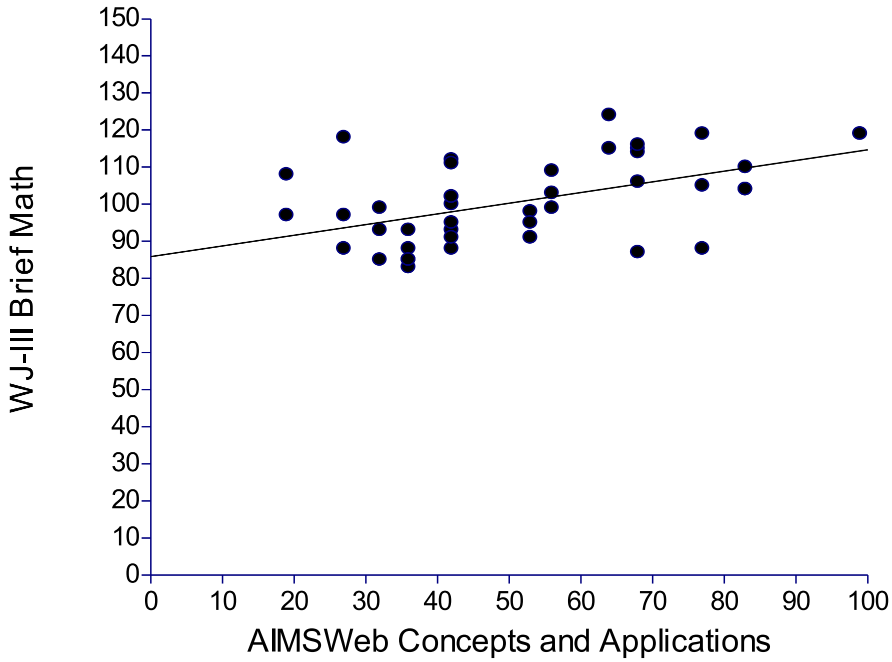

Figure C19d. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Brief Math, Fifth Grade

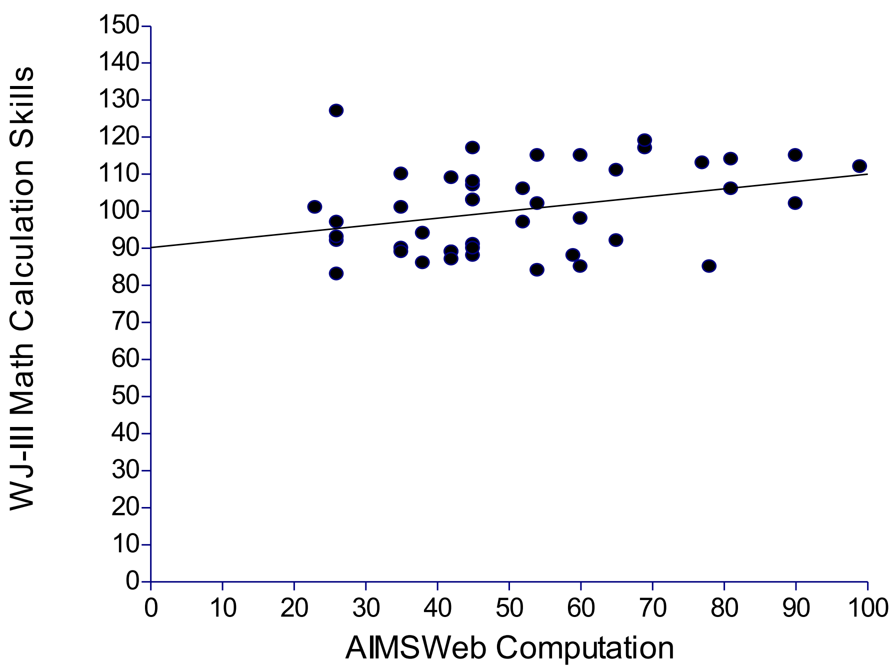

Figure C19e. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Calculation Skills, Fifth Grade

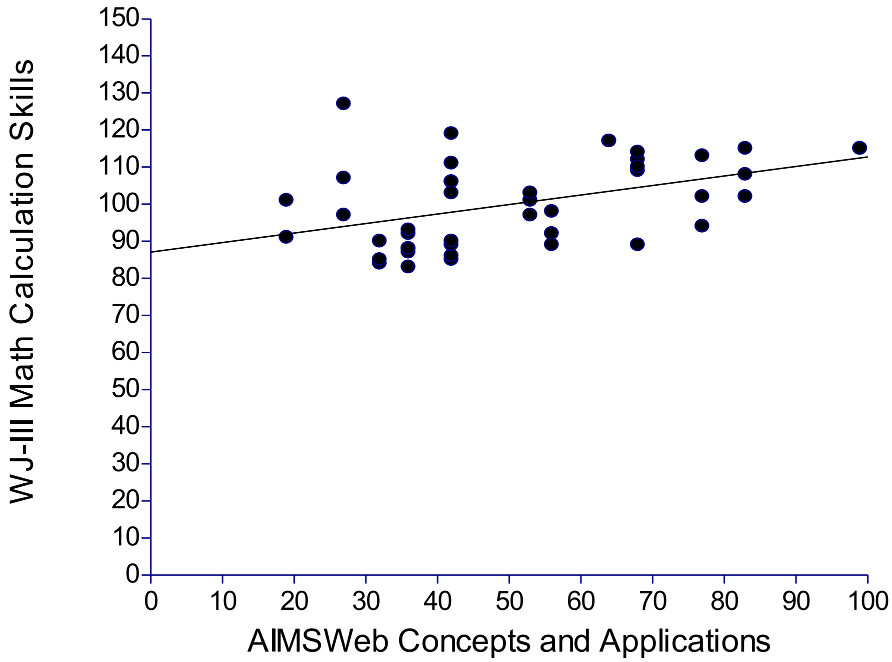

Figure C19f. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Calculation Skills, Fifth Grade

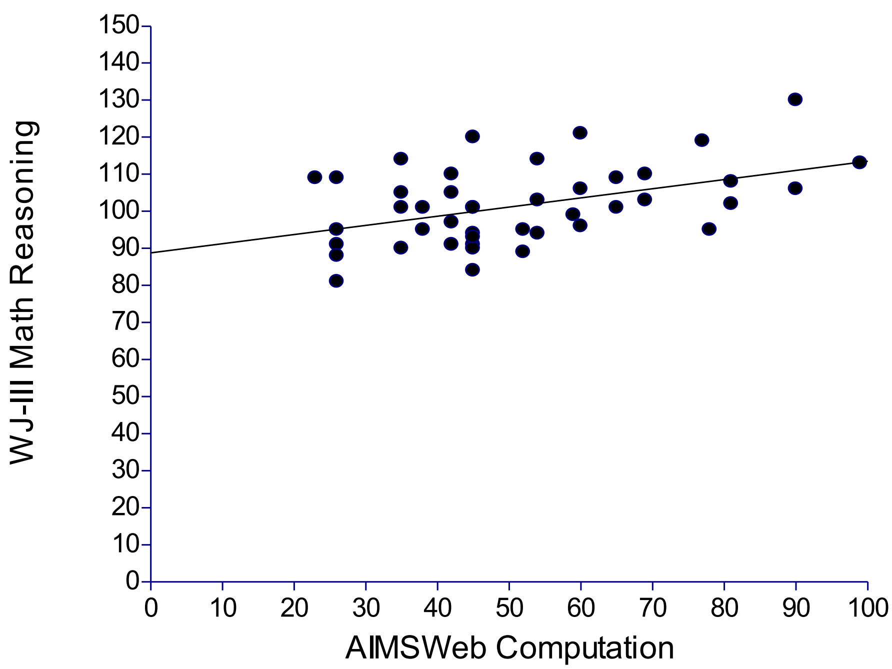

Figure C19g. Scatterplot for AIMSWeb Computation Winter Benchmark and WJ-III Math Reasoning, Fifth Grade

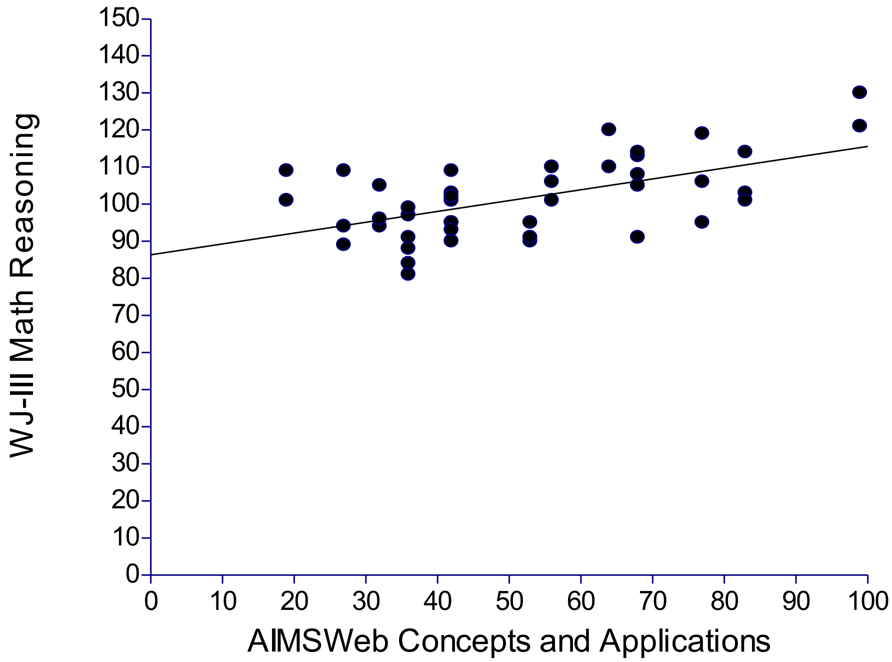

Figure C19h. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and WJ-III Math Reasoning, Fifth Grade

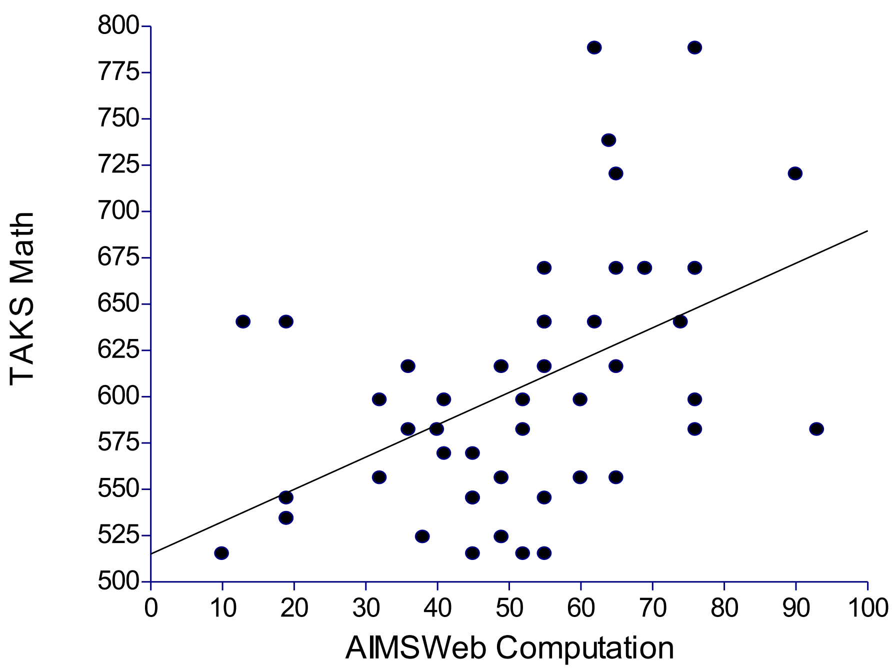

Figure C20a. Scatterplot for AIMSWeb Computation Winter Benchmark and TAKS Math, Third Grade

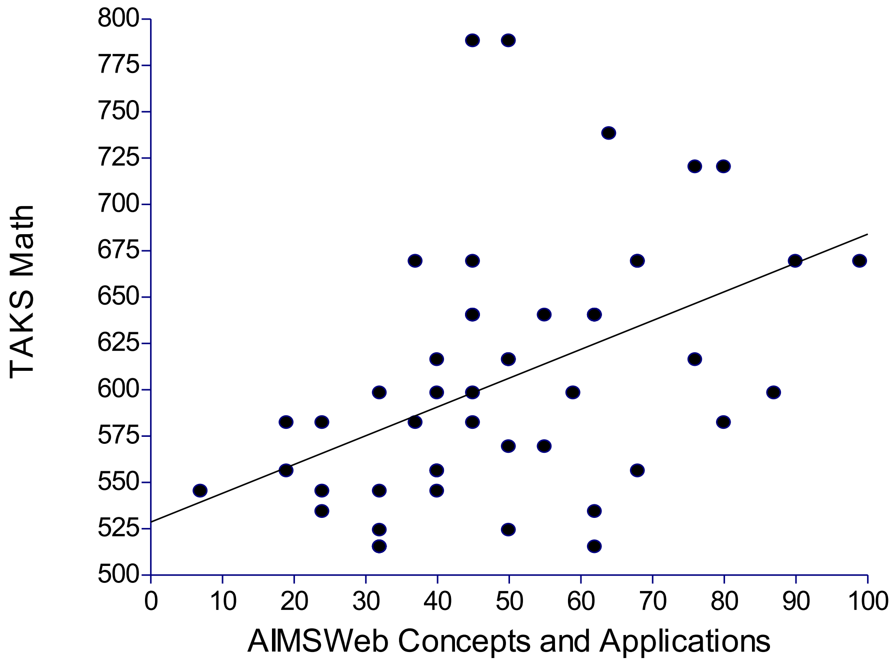

Figure C20b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and TAKS Math, Third Grade

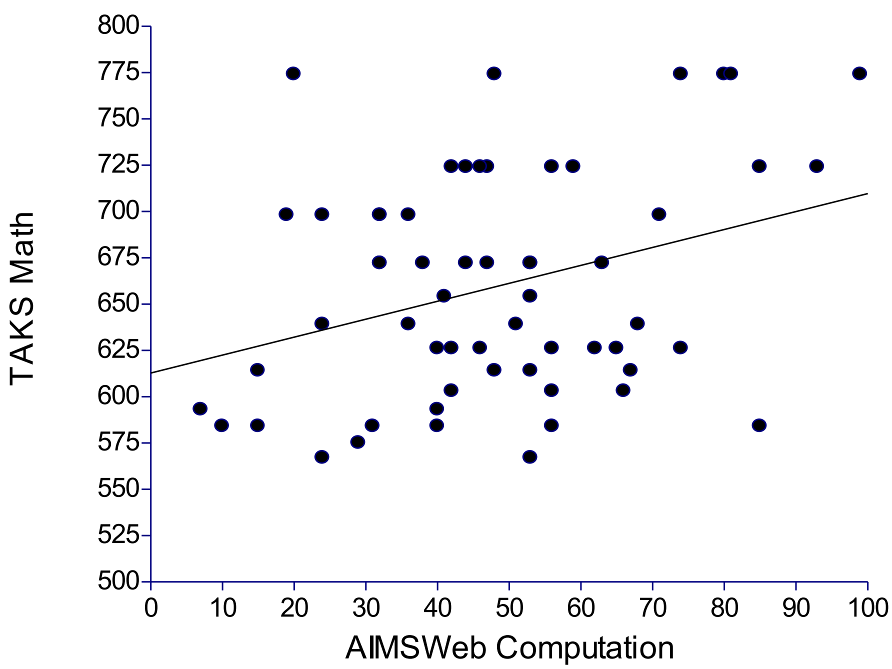

Figure C21a. Scatterplot for AIMSWeb Computation Winter Benchmark and TAKS Math, Fourth Grade

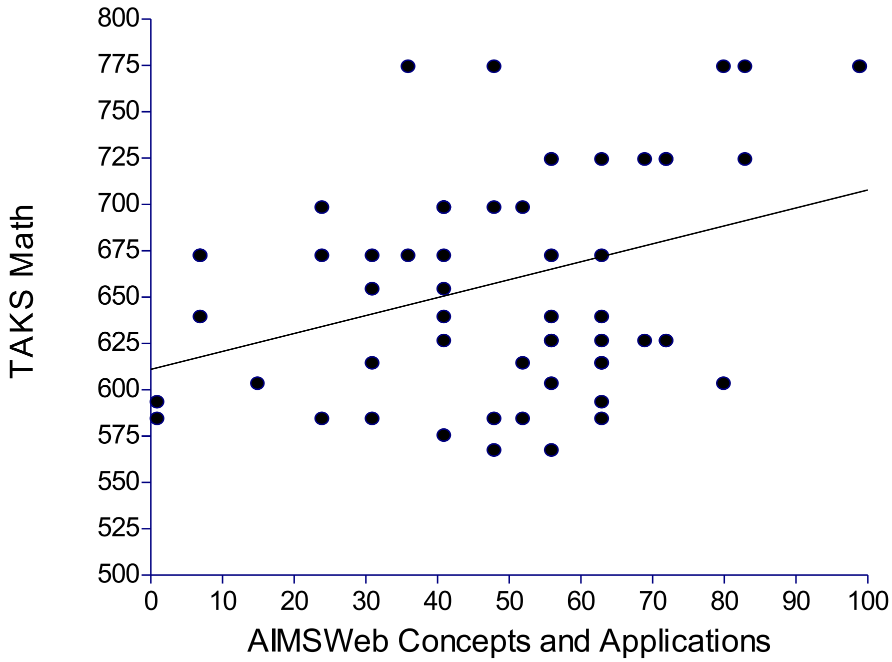

Figure C21b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and TAKS Math, Fourth Grade

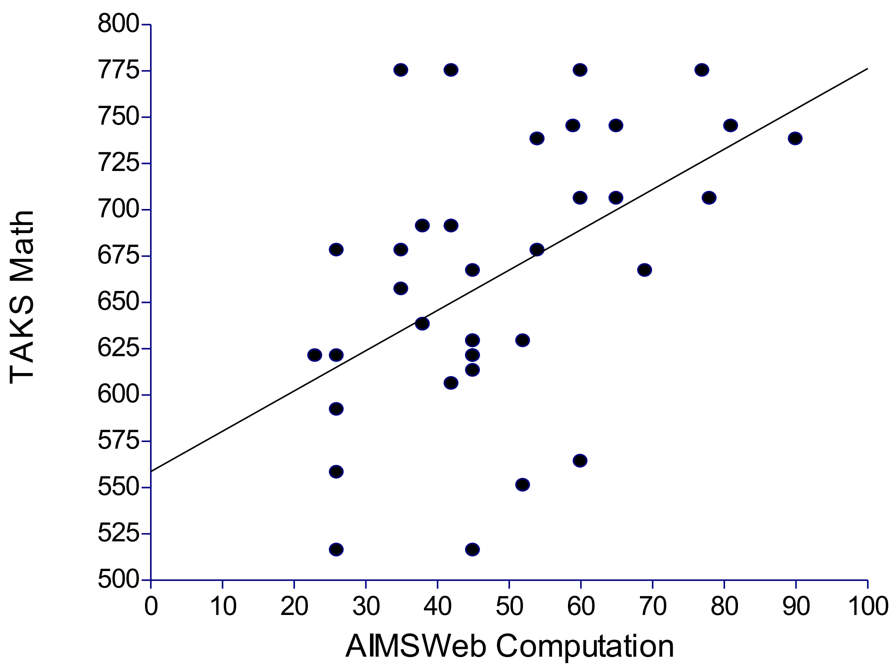

Figure C22a. Scatterplot for AIMSWeb Computation Winter Benchmark and TAKS Math, Fifth Grade

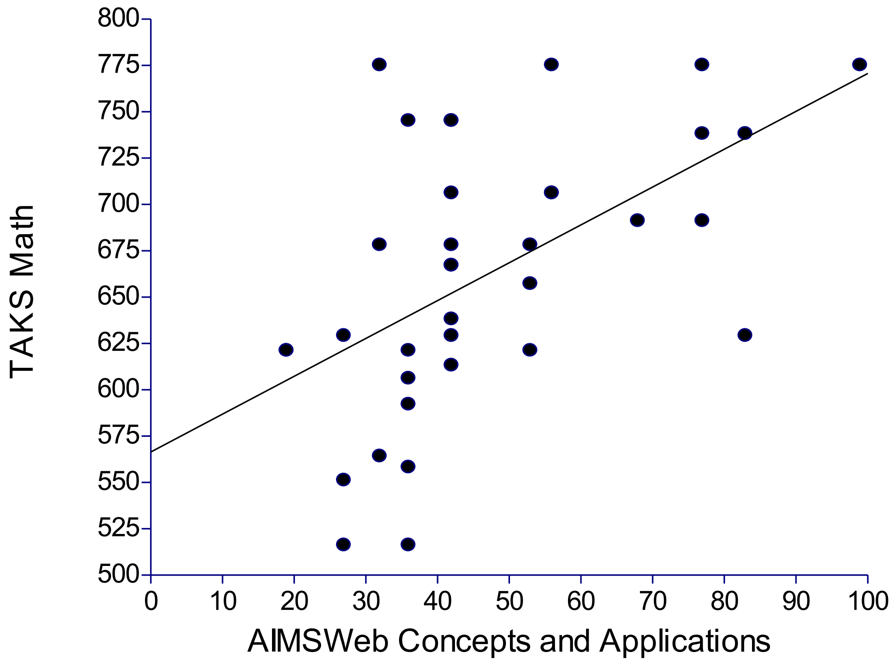

Figure C22b. Scatterplot for AIMSWeb Concepts and Applications Winter Benchmark and TAKS Math, Fifth Grade

APPENDIX D

RELIABILITY OF MEASURES USED IN THIS STUDY

Table D1
One Year Test-Retest Reliability Coefficients for the Standardization Sample, Math Subtests of the WJ-III

Subtest	Ages 8-10
Calculation	0.83
Math Fluency	0.86
Applied Problems	0.85
Quantitative Concepts	0.91

Table D2
Internal Consistency Reliability Coefficients for the Standardization Sample, Scales of the SMALSI

Scale	Full Sample	Male	Female	Third Grade	Fourth Grade	Fifth Grade
Study Strategies	0.77	0.78	0.77	0.76	0.75	0.76
Note Taking/ Listening Skills	0.81	0.81	0.80	0.77	0.77	0.83
Reading/ Comprehension Strategies	0.79	0.80	0.78	0.80	0.78	0.77
Writing/ Research Skills	0.69	0.68	0.69	0.64	0.68	0.71
Test-Taking Strategies	0.76	0.76	0.75	0.68	0.73	0.79
Time Management/ Organizational Techniques	0.77	0.77	0.78	0.75	0.75	0.80
Low Academic Motivation	0.83	0.84	0.81	0.79	0.85	0.82
Test Anxiety	0.89	0.89	0.89	0.86	0.88	0.89
Concentration/ Attention Difficulties	0.85	0.85	0.85	0.82	0.86	0.85

Table D3
Internal Consistency Reliability for the AIMSWeb Computation

Study	**Subjects**	
Fuchs, Fuchs, & Hamlett (1988)	46 LD, 2 MR, 14 SED students, Grades 3-9	0.93

Table D4
Internal Consistency Reliability for the AIMSWeb Concepts and Applications

Grade	
Third Grade	0.80
Fourth Grade	0.81
Fifth Grade	0.84

Table D5
Internal Consistency Reliability for the Spring 2010 TAKS Math Test, Statewide Results

Grade	
Third Grade	0.71
Fourth Grade	0.77
Fifth Grade	0.74

VITA

Name: David Andrew Kahn

Address: 504 Liberty Circle
Friendswood, Texas 77546-4030

Email Address: davidandrewkahn@gmail.com

Education: B.M., Music Studies, The University of Texas at Austin, 1997
M.A., School Psychology, University of Houston-Clear Lake, 2005
Ph.D., School Psychology, Texas A&M University, 2011

Professional Experience:

Post-Doctoral Fellow in Pediatric Psychology, Arkansas Children's Hospital, University of Arkansas Medical Sciences, College of Medicine, Department of Pediatrics, Psychology Section, Little Rock, Arkansas, 2011-2012

Pre-Doctoral Psychology Intern, Beatrice State Developmental Center, Nebraska Internship Consortium in Professional Psychology, 2010-2011

Lecturer, Texas A&M University, Department of Psychology, 2007-2009

Graduate Assistant, Texas A&M University, Department of Educational Psychology, 2006-2010

Licensed Specialist in School Psychology Trainee, Galena Park Independent School District, Houston, Texas, 2005-2006

Licensed Specialist in School Psychology Intern, Galena Park Independent School District, 2004-2005

Instructional Assistant, University of Houston-Clear Lake, School of Human Sciences and Humanities, 2002-2004

Fourth Grade Teacher, West University Elementary School, Houston Independent School District, 1999-2002

Individual Vocal Instructor, Stephen F. Austin High School, Austin Independent School District, 1997-1999